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THE WORKING OF X-RAY DEPARTMENTS IN HOSPITALS.

By **Herschel Harris, M.B., Ch.M. (Syd.),**

Honorary Consulting Radiographer, Sydney Hospital; Honorary Radiographer, Royal Prince Alfred Hospital; Honorary Radiographer, Royal Alexandra Hospital for Children.

It has often appeared to me since returning to Australia that some special departments in general hospitals do not get the attention and assistants that they deserve.

Reference will only be made to X-ray departments in which I am mainly interested. The other departments can look after themselves.

The great *desideratum* in X-ray departments is that there should be continuity. Hundreds of pounds worth of apparatus may be at stake, and perhaps several tubes are just tuned up to perform certain work, when a new resident medical officer will come along and smash them all up. I have had a new resident medical officer damage as many as six tubes in one week, and then blame the tubes, as being faulty.

Now I contend that in each X-ray department there should be a sister in charge. She should be paid a special salary, and no mean one at that, and, if possible, and necessary, she should have an understudy to replace her. In addition to this, there should be a male assistant, to do the heavy work. This applies to the larger hospitals. The smaller hospitals, perhaps, could do with a perfectly trained sister alone, and, if necessary, she could get temporary assistance from the dispenser. This is what is done at Fulham Cancer Hospital, where the excellent work is mainly carried out by the dispenser and a sister, who is in charge of the X-ray department. The Honorary Radiographer visits the hospital and interprets the plates.

Radiography has reached that stage now that lay assistants may be trained to make the plates, but the interpretation must always be carried out by a skilled medical man.

Are resident medical officers necessary? My experience is that they are more or less unsatisfactory—principally more.

In Britain, America and France they dispense with them.

In Australia, as a rule, after a deal of persuasion, a resident medical officer will condescend to take on the work in a half-hearted manner, and then, after a few months, will throw it up. Meanwhile, the department has suffered.

I refer to no special hospital; I refer to all I have been connected with. Occasionally a hospital is fortunate in obtaining the services of a very excellent resident medical officer, and then it makes one stop and think: what will happen when this resident has gone? This applies at present at the Royal Prince Alfred Hospital, which, for the past couple of years, has been very fortunate in having Dr. Voss as resident radiographer. Not only has she done excellent work for the department, but she has been instrumental in training others, who are carrying on similar work elsewhere.

This brings me to another point, and that is, I consider that a number of sisters who are willing to undertake the work, should undergo a training in the larger hospitals, and so qualify to carry on such work in other institutions.

One is always being asked to select an X-ray outfit for a certain hospital. It is an easy matter to select an outfit, but who will work it?

There are, and will be, many openings for such assistants. I think I am safe in saying that a dozen positions could be filled to-morrow, if the applicants were available.

Women act particularly well in such departments, and those of you who have been abroad and have visited the large X-ray departments will bear me out in this statement.

In conclusion, let me repeat that:—

(1) The main factor in conducting satisfactorily an X-ray department is that there should be continuity.

(2) This can be best obtained by the employment of a permanent sister in charge of the department, with an understudy.

(3) When it can be arranged, a resident medical officer should be attached to the department, mainly as a supervisor, not to do any of the mechanical work, but to give any necessary instructions concerning the cases, and to interpret such of the plates and screen examinations as cannot be kept for the Honorary Radiographer.

By this method a senior resident medical officer could devote, say, one hour or so daily to this department, which would no doubt be a pleasant recreation which he would willingly undertake.

Let me state that, for a large institution, a sister cannot be trained to carry on the work in a satisfactory manner under six months. By this time she should be able to administer opaque meals and perform quite a number of preliminary examinations.

THE HYPOCHLORITES.[1]

An Enquiry into the Formulæ of Solutions of Hypochlorites Used in Surgery.

By **R. C. Cowley.**

Director of the College of Pharmacy, Brisbane.

Bleaching Powder.

Bleaching powder or chlorinated lime is the basic substance from which the different surgical solutions, known under various names, have come into use, or rather have been re-introduced, since the beginning of the war. Its constitution remains unsettled, not-

[1] This article was submitted to *The Australasian Journal of Pharmacy* and published in the September issue. It was subsequently offered to us, and in publishing it, we express our indebtedness to the Editor of *The Australasian Journal of Pharmacy* for his courtesy in consenting to this course.—[Ed.]

withstanding that it has been subjected to numerous investigations during the last 70 years or so. When acted upon by water a portion goes into solution forming chloride and hypochlorite of calcium.

The quantity of available chlorine in bleaching powder is variable. Its composition is affected by the temperature at which the lime has been chlorinated, the purity of the lime, the amount of moisture in it at the time of chlorination, and the conditions under which it has been stored.

The British Pharmacopœia requires it to contain at least 30% of available chlorine, that is chlorine liberated on the addition of a mineral acid. On keeping, especially if at all damp, some of the hypochlorite is converted into chlorate, which, if present in bleaching powder, liberates chlorine on addition of an acid. Since it is the hypochlorite that is required for surgical purposes a better method of estimation is to titrate it with an alkaline solution of arsenious oxide, using as an indicator paper moistened with starch water and potassium iodide. This reaction is substantially as follows:—

$$As_2O_3 + Ca2ClO = As_2O_3 + CaCl_2.$$

A solution of bleaching powder in water containing, when first prepared, 3% of available chlorine, is official. It should not be stored for long, as all solutions of hypochlorites deteriorate through loss of oxygen on keeping. There does not appear to be any particular reason why this solution when diluted should not be used in surgery The best dilution appears to be that which contains 0.5% by weight and volume of calcium hypochlorite. Its alkalinity is chiefly due to hydrolytic action of water on calcium hypochlorite and to the small quantity of lime (CaO) in solution. Its comparative freedom from alkalinity should be an advantage.

Hypochlorous Acid.

A dilute solution of hypochlorous acid can be prepared in a variety of ways. For convenience it is best prepared by adding an exact quantity of a dilute mineral acid, such as nitric acid, to a solution of bleaching powder necessary to liberate the hypochlorous acid, but not the hydrochloric acid, for if the latter acid is set free, it reacts with the hypochlorous acid to produce free chlorine. Hence it is necessary to make a preliminary estimation by means of $^{n}/_{10}$ alkaline solution of arsenious acid of the calcium hypochlorite present.

Local supersaturation must be avoided to prevent liberation of chlorine. The most suitable acid for the purpose of liberating hypochlorous acid, is boric acid, since it liberates hypochlorous acid fairly rapidly and hydrochloric acid extremely slowly.

A mixture of bleaching powder and boric acid in equal proportions is known as "eupad," and a solution of the soluble matter of 12.5 grammes of bleaching powder to which a solution of a similar quantity of boric acid is added and made up with water to a litre, is the well-known Dakin's solution.

Borate of calcium is soluble in a solution of calcium chloride but a deposit forms on standing. Borates are of variable composition. This is explained by the fact that water causes hydrolysis forming compounds richer in B_2O_3. For example, boric acid is neutralized by sodium hydroxide in the presence of a substance that prevents hydrolysis to form a metaborate.

$$H_3BO_3 + NaOH = NaBO_2 + 2H_2O \text{ or}$$
$$2H_3BO_3 + 2NaOH = Na_2O, B_2O_3 + H_2O.$$

Glycerine in fairly large proportions has been found the most suitable substance for this purpose. When water alone is used the product contains double the quantity of B_2O_3, forming the compound which is familiarly known as borax.

$$4H_3BO_3 + 2NaOH = Na_2B_4O_7 + 7H_2O, \text{ or}$$
$$4H_3BO_3 + 2NaOH = Na_2O, 2B_2O_3 + 7H_2O.$$

Similarly, calcium metaborate $Ca_3 2(BO_3)$ $(3CaO, B_2O_3)$ is hydrolyzed by water with liberation of calcium hydroxide, and forms compounds richer in B_2O_3, *e.g.*, $CaO, 2B_2O_3$, $CaO, 3B_2O_3$, etc.

Dakin's solution is very unstable. It should be freshly prepared and adjusted to contain a definite quantity of hypochlorous acid. Analytical control of all these preparations cannot be too strongly urged, since their value as germicides depends upon the amount of oxygen they are capable of liberating when in contact with oxidizable organic matter. Surgeons should insist on this, for without proper control tests, these solutions may be useless. By nature of its constitution Dakin's solution should be rapid in action.

Liquor Sodæ Chlorinatæ B.P.

Some years ago (1906) the writer pointed out that the quantity of sodium carbonate in the British Pharmacopœial formula was too small to precipitate the whole of the lime in solution. It should be increased to double the weight of the chlorinated lime in the formula. The 1914 British Pharmacopœia gives the same formula as that of 1898. Actually the soluble matter in the lime compound requires much more sodium carbonate for complete precipitation, but when the sodium carbonate and chlorinated lime are mixed as in the manner prescribed in the official formula, chemical action is never complete. When the proportions of lime compound and carbonate of soda are 50 and 100 respectively, as the writer suggests, it is found that, when operating with a bleaching powder containing 30.6% of available chlorine, there is no excess of lime or of sodium carbonate in the product. An extent of alkalization of the sodium carbonate is, however, produced that would probably be deleterious in treating wounds. Working with the following formula, the amount of sodium hydroxide in the product amounted to 17.6 grammes per litre.

Bleaching powder	50 grammes.
Sodium carbonate (Na_2CO_3, $10H_2O$)	100 grammes.

Triturate the bleaching powder with a solution of the sodium carbonate, make up to 1 litre, allow to stand 12 hours, filter and make up to 1 litre by passing water through the filter. The amount of sodium hypochlorite and of sodium hydroxide can be estimated in the same volume of solution. Five cubic centimetres ($^{n}/_{10}$) are placed in a dish and titrated with an alkaline solution of As_2O_3, to determine the amount of sodium hypochlorite present, sodium car-

bonate being, of course, the alkaline salt used for dissolving the arsenious oxide. When the action is complete, this liquid is poured into a 100 c.cm. flask; the dish is rinsed with recently boiled water into the flask; 10 c.cm. of normal barium chloride solution is added to precipitate the carbonate; and finally the liquid in the flask is made up to 100 c.cm. with boiled water. After standing sufficiently long to precipitate the carbonate of barium, 50 c.cm. are taken and titrated with $^{n}/_{10}$ hydrochloric acid. The result is rather low, but is a sufficiently close approximation to show that undue alkalization of the sodium carbonate occurs.

The question now arose as to the best means of neutralizing the free alakali. Both boric acid and sodium bicarbonate suggested themselves. It is interesting to note here that some formulæ for surgical solution of sodium hypochlorite contain boric acid, but it does not appear that the originators were clear in their minds as to the true reason for the addition. The addition of boric acid was a happy hit, but without some method of determining the quantity of free alkali present, it is not possible to adjust the proportion of boric acid correctly. Any excess would liberate hypochlorous acid and render the solution less stable. Alkaline hypochlorites are well known to be more stable in solution than hypochlorous acid; indeed, they require very prolonged boiling to convert them completely into chloride and chlorate. Exposure to light has a similar effect. Just about this time the writer's attention was drawn to a paper in the *Proceedings of the Royal Society of Medicine* (Vol. 10, No. 1, November, 1916), by W. O'Neill Sherman, M.D., in which he describes Daufresne's modification of Dakin's solution. This in reality is a solution of sodium hypochlorite made by the following formula:—

Bleaching powder (25% available chlorine) 20 grammes.
Sodium carbonate dry (soda of Solway) 10 grammes.
Sodium bicarbonate .. .. 80 grammes.
Water to a sufficient quantity to produce a solution containing 0.5 to 0.6% of available chlorine estimated by the B.P. method.

The process is substantially that of the British Pharmacopœia, and the product is said to be neutral. It is, however, difficult to see how this can be so. The amount of alkaline salts in the formula closely approximates that which the writer found by experiment to be necessary with the sample of bleaching powder he operated upon. This appears to be the best of the process already published for the preparation of solution of chlorinated soda. The chief objection lies in the rigidity of the formula, seeing that bleaching powder is so variable a product. Bearing this in mind, the writer set out to draft a formula which would accommodate itself to the variations in the constitution of the bleaching powder, and at the same time one that would produce a neutral solution or approximately so.

This necessitated dissolving the bleaching powder in water: filtering, estimating the amount of lime compounds in solution and adding the exact amount of sodium carbonate to precipitate the lime; finally adjusting the liquid to contain 0.5% of sodium hypochlorite. The method finally adopted was as follows:—

Bleaching powder .. .. .. 50 grammes.
Sodium carbonate .. .. .. a sufficient quantity.
Water .. .. a sufficient quantity.

Triturate the bleaching powder in a mortar with 500 c.cm. of the water, transfer to a bottle, shake well from time to time and allow to stand for 12 hours; filter and pass water through the filter to make up to 500 c.cm. Dissolve 200 grammes of crystallized sodium carbonate (washing soda) in water, and make up to 1 litre. To 20 c.cm. of the bleaching powder solution in a porcelain dish add 10 c.cm. of dilute hydrochloric acid; boil until all the chlorine has been expelled; add 2 drops of solution of sodium carbonate until the red colour of the methyl orange is destroyed. This is solely for the purpose of neutralizing the liquid exactly; the volume of sodium carbonate solution used is ignored. Continue to boil to expel the CO_2. When this is accomplished, add a few drops of phenolphthalein solution and continue to run in the sodium carbonate solution until the liquid acquires a pink colour. The volume of sodium carbonate solution run in after adding the phenolphthalein represents that required to precipitate the soluble lime salts in 20 c.cm. of the solution. From this calculate the volume required for the other 480 c.cm. of solution of bleaching powder. Mix these together, allow to stand, when most of the clear solution may be poured off, filter the remainder and pass some water through the filter. Determine the amount of sodium hypochlorite in the solution by the alkaline arsenious oxide method and add water to adjust the amount to 0.5% by weight and volume of sodium hypochlorite.

The quantity of free alkali in this solution is so extremely small as to be of no signification. As sodium hypochlorite is hydrolyzed by water to some extent, the solution will afford an alkaline reaction.

The above solution is strongly hypertonic, being equivalent to 7.5 times that of an isotonic solution. When diluted with water in the proportion of 1 to 7.5 to produce an isotonic solution, it would be too dilute for treating foul wounds, but would probably be quite suitable for treating those which are only slightly septic. It is suggested that the solution should be graded in accordance with the amount of septic matter present.

Liquor Aluminii Hypochloritis.

The use of this substance as an antiseptic is by no means new. It was the subject of a patent in the year 1860. It may be prepared as follows:—

Mix 50 grammes of bleaching powder with 500 c.cm. of water; filter and pass sufficient water through the filter to make up to 500 c.cm. Dissolve the exact quantity of aluminium sulphate, $Al_2 3SO_4$, $18H_2O$, in 500 c.cm. of water, mix, allow to stand until precipitation is complete; pour off the clear liquid; filter the remainder, and adjust the liquid after titration

with $^{n}/_{10}$ alkaline As_2O_3 solution to contain 0.5% by weight and volume of aluminium hypochlorite.

To find the exact quantity of $Al_2 3SO, 18H_2O$, proceed exactly as described under the formula recommended above for making solution of sodium hypochlorite, using this time a normal solution of sodium carbonate. For example, in an experiment it was found that 20 c.cm. of the bleaching powder solution required for complete precipitation of the lime in solution 9 c.cm. of normal Na_2CO_3.

20 c.cm. bleaching powder solution = 9 c.cm. of n.Na_2CO_3.
500 c.cm. bleaching powder solution = 225 c.cm. of n.Na_2CO_3.
$3Na_2CO_3 = Al_2 3SO_4, 18H_2O$.
$106 \times 3 = 666$
$53 = 111$
1000 c.cm. = 111
225 c.cm. = $.111 \times 225 = 247.5$ grammes of $Al_2 3SO_4, 18H_2O$, the quantity required.

Solution of aluminium hypochlorite has not to the knowledge of the writer been used in the treatment of wounds in recent years. The acetate has been extensively used with much success. It is possible that the hypochlorite may also be found valuable for this purpose.

As alumina is a comparatively weak base, the salt is readily hydrolyzed by water and its solution will not be as stable as that of sodium hypochlorite.

Reports of Cases.

A CASE OF AMŒBIC DYSENTERY APPARENTLY CONTRACTED IN AUSTRALIA.[1]

By **W. H. Nelson, B.A. (Cape Colony), M.B., B.S. (Melb.),**
Honorary Anæsthetist and Acting Honorary Assistant Physician, Perth Public Hospital.

BACTERIOLOGICAL NOTES.

By **C. H. Shearman, M.B., Ch.M. (Syd.),**
Pathologist, Central Board of Health, Perth.

On February 26, 1917, J. S. B., a butcher by trade, aged 35 years, consulted me for bowel trouble. Fourteen days previously he got an attack of diarrhœa which had continued ever since. Seven days later blood appeared in the stools, bright in colour, and also slime. He had no vomiting, though there was some nausea. He also complained of pain in the abdomen, not localized to any definite region, but rather diffuse than otherwise. On admission he had tenesmus as well. The number of stools was not large, two to three a day as a rule, but on some days the number increased to more than six. His appetite was good, but he had restricted his diet, largely for fear of it making him worse. He attributed his attack to eating fruit.

An examination of his abdomen did not reveal anything abnormal. The temperature was not raised and the pulse was normal. The tongue was clean. He appeared to be suffering from an ordinary diarrhœa due to partaking heartily of fruit which had probably been over-ripe. He had had medicines from a chemist and had taken plenty of castor oil. I placed him on a bismuth and magnesium carbonate mixture (1.00 gm.) and chinosol (0.18 gm.) in water to be taken at once, a disinfectant I have found of great use in diarrhœa due to ptomaine poisoning or over-ripe fruit.

He returned on March 2nd, still passing blood. The number of stools was increasing. He was looking thin, his lips were a bad colour, his eyes a little sunken, and his tongue coated. I changed his mixture to *mist. plumb. cum opio* (*plumb. acet.* 0.12 gm., *ac. acetic. dil* 1 c.cm., *tr. opii* 0.3 c.cm.). I restricted his diet solely to milk. On March 5th he stated that he was passing 3 to 5 stools every morning, but was always better in the afternoon or evening. Blood was still present. There was regular pain on passing the motion, and tenesmus, and the amount passed was lessening. As he had not improved under ordinary diarrhœal treatment, I came to the conclusion that fruit or tainted foodstuff could not be held accountable, and that there was a strong possibility of either bacillary or amœbic dysenery being the cause.

He had been in the South African war, where, like the majority of us who were in that affair, he had had occasional attacks of diarrhœa. He was a Lancashire man by birth, and previous to the Boer War had not been out of England. After the war he came out to Australia. He had always enjoyed good health, and had never had any attacks of diarrhœa out here until this one. It was therefore rather improbable that the condition was bacillary or amœbic dysentery. Tubercular disease of the intestine could not be considered as a likely cause, as he had no signs of tuberculosis elsewhere. I took a specimen to the Central Board of Health, and Dr. Shearman stated that it had the appearance of a typical bacillary stool, very fluid, streaked with blood, slimy with no visible fæces present. An immediate examination of a loopful discovered active amœbæ. As the non-pathogenic *amoeba coli* is also found in the bowel this was not conclusive evidence. Dr. Shearman considered it more like the bacillary stools he had dealt with in such large numbers in Egypt. Acting on his advice, I placed the man in a hospital, where he was kept rigidly quiet and on milk diet. I placed him on a bowel washout followed by a pint of saline solution, to be retained if possible, a starch enema with laudanum (1 c.cm.) for the tenesmus and fomentations to the stomach. From March 7th to 9th he had no motions, but still had slight pains in stomach. The tongue began to clean up. I ordered *ol. ricini* and a mixture of bismuth, magnesium sulphate, and salol every four hours. On the 10th it was reported to me that he had had a good motion containing some dark blood; the bowels were opened the same day without the passage of any blood. Dr. Shearman's report came on the same day, and was as follows: "Suspicious amœbæ present. No dysentery bacilli isolated." I consulted Dr. Shearman over this report, but he would not commit himself to a definite decision, and asked for more samples. I therefore kept the patient quiet, and continued the bismuth and magnesium sulphate-salol mixture, which had the effect of producing fluid stools night and morning. The diet was increased by the addition of arrowroot, fish and potatoes. On the 15th the mixture was stopped. From the 15th to the 17th the stools were regular, once a day, with slight traces of blood. His aspect began to change, his pulse improved, and the heart sounds changed from soft toxic sounds to normal ones. On the 17th he had stools with blood, first one formed, then a semi-fluid one, and I found that by mistake the bismuth salts mixture had been resumed the day before. I cut down his diet again, and he improved until the 19th, when he had a relapse, semi-fluid stools with rather more blood, capricious appetite, greyish lips, a dirty tongue, a muddy complexion, feeble pulse and heart sounds, a tender abdomen, etc. I placed him right back on milk, and gave him magnesium carbonate 0.65 gm., magnesium sulphate 5.5 gm. in peppermint water, three times a day. The bowel was washed out, and one pint of saline injected per rectum as before. Hitherto he had always succeeded in retaining the saline enema, but on the 20th he rejected it. He had no motions on that day and the following day. He was therefore given castor oil, and his diet was increased slightly by the addition of bovril. He was then looking much better again. He had to have an enema before the bowels opened. The stools were examined on several occasions, but neither amœbæ nor bacilli could be detected, and I refrained from giving a hypodermic injection of emetine hydrochloride on the assumption that it might be the bacillary form. This was because in the bacillary type two toxins are formed, one closely resembling that of diphtheria toxin with a similar action on the heart; if it had been a case of bacillary dysentery the administration of

[1] Read at a meeting of the Western Australian Branch of the British Medical Association, May 16, 1917.

such a depressing drug as emetine might have caused a disaster.

Cases of this nature have occurred in Egypt. I tried to get some serum, but was unsuccessful. On the 26th the man had improved so much, and his circulation was so good, that I decided that emetine would do no harm, and began hypodermic injections of 0.02 gm. three times daily. The result was excellent; he rapidly improved, his appetite came back, his facial aspect returned to normal, and he became restless of hospital restraint. I quietly increased his diet daily, but he declined many articles, as he was afraid they might be injurious. I discharged him on the 30th of March, and asked him to let me have a formed stool as soon as he could, as it is in this type of stool that the encysted amœbæ is found, the form which is absolutely diagnostic. He reported himself on April 5th, looking very fit. He was taking castor oil to open his bowels. He had an enormous appetite, which he held in stern control. He was getting stronger every day, but still had bad pains, but none over liver area, more in the region of the stomach. I considered this was due to the stomach getting more work than it could manage, and so ordered him tablets of Taka-diastase pepsin and strychnine. They had a good effect. On the 12th he brought a solid motion to me, the day before leaving for the East on a trip. Dr. Shearman was then able to report definitely that it contained the cysts of *Entamœba histolytica*. As the man had only had emetine injections for four days, it is hopeless to consider him as cured, and as soon as he returns I intend to put him through a course of 12 days at least. Even this amount has not proved curative permanently in many cases. A few months back an article appeared in the *British Medical Journal*, comparing non-successful emetine cases with completely successful emetine bismuthous iodide ones. This was given by the mouth in keratine-coated capsules, and was so highly objectionable that the patients had to be watched to see they took it.

My sole reason for bringing this case to your notice to-night, is the rarity of the complaint in Western Australia. It is possibly not the first one that has occurred, but I think I can claim that it is the first one that has been published. The Central Board of Health know of no other cases that have occurred in Western Australia. I am informed that it is not endemic in Australia. I cannot express a definite opinion as to how this man received his infection, in view of the fact of the rarity of the complaint. He could not have carried the infection from South Africa, as amœbic cases are very rare there. The bacillary type predominated in the South African War. It is doubtful if he had an attack even of bacillary dysentery, for the rations at times were enough to give anyone diarrhœa. The most likely cause is an infection from a soldier who had amœbic dysentery in Egypt or some other country where it is endemic, and had returned to this country. The infection is probably a fly-borne one, and in his business he would have plenty of flies on hand. He lives in a suburb that still has the pan system, and most people are notoriously careless about their closets. They do not have a disinfectant ready to throw in after each defæcation, and a lid to cover the seat is a refinement that only deserves to be laughed at. The result is that flies can easily pick up this particular infection and transfer it to foodstuffs. Now that returned soldiers are coming back in numbers from the endemic centres, suffering from this complaint, it should be incumbent on the authorities, military and civil, to have every case watched until quite cured, for nothing is more likely than that flies are the cause of transferring infection. I am informed that the amœba lives in sand; it will therefore find Perth all right in that respect. Cases of both types of dysentery are already occurring in France among the men in the trenches, who have never before been out of England, and they must get their infection from the soldiers who have come from endemic centres. It is interesting to note that the general symptoms of my patient pointed to the bacillary type, in that he had spells of freedom with constipation, alternating with attacks of diarrhœa with blood and tenesmus. Medicinal treatment had hardly any influence, and he seemed better when he was on rectal saline injections alone. The improvement under emetine was rapid, and I felt convinced, before receiving the final report, that the amœba was the cause.

P.S.—Since the above was written I have heard from the patient, who is still in Melbourne, to the effect that he has had a relapse, and is receiving treatment with emetine injections. He is still in Melbourne (September).

Bacteriological Notes.

On March 5, 1917, I received from Dr. Nelson a specimen of fæces from a case of dysentery.

The specimen consisted of blood and mucus, no fæcal matter being apparent.

Microscopically much blood was seen, as well as numerous degenerated and hydropic mucosal and pus cells. Large active amœbæ were present, which suggested *A. coli* rather than *A. histolytica*.

The amount of mucosal damage and the appearance of these amœbæ made me think the case was one of acute bacillary dysentery, the patient harbouring at the same time the harmless amœba coli.

I advised Dr. Nelson accordingly, and suggested that emetine be not given, but that at the earliest opportunity a formed stool be submitted for examination. When the motions become formed, the encysted forms of the amœbæ appear in the stool and are characteristic, the cyst of the *A. coli* containing eight nuclei and being larger than that of the *A. histolytica*, which contains only four nuclei and also chromidial bodies.

Though differences are described between the active vegetative forms of these amœbæ, it is frequently impossible to say until the encysted forms appear, which variety of amœbæ is present.

In the present instance the history of the case and the type of cells present in the specimen submitted, largely influenced me in calling the case one of bacillary dysentery.

If one considers the pathology of the two types of dysentery, the value of the cytological picture, as seen in the stool, becomes apparent as an aid to diagnosis.

In amœbic dysentery the large gut is the seat of varying numbers of oval punched out ulcers. The encysted forms of the amœbæ enter the body by infected food or drinking water. It has been shown by Wenyon and others that the encysted forms of the amœbæ can readily pass through the intestine of the ordinary house fly, *Musca domestica*, so that given a few amœba carriers, the house fly, and some exposed food the means for propagating the disease are at hand.

Since the Gallipoli campaign some hundreds of men must have returned to Australia who are harbouring the encysted form of *Amœba histolytica*, *i.e.*, who are amœba carriers.

Having entered the body, the cysts pass through the stomach unharmed, the hard keratine-like coat of the cyst protecting the organism from the action of the gastric juice. Development proceeds in the intestine, and by the time the large gut is reached, each cyst has given rise to four small amœbæ. These young forms, or entamœbæ, enter the mucosal coat by passing between the mucosal cells, probably by secretion of a substance which causes dissolution of the inter-cellular cement substance.

The amœbæ then enter the lymphatics and gain entrance to the submucosa, where they multiply, feeding chiefly on the red blood corpuscles of their host. They induce an œdematous infiltration which gives rise to small elevations on the surface of the mucosa. These eventually slough off, leaving the characteristic ulcers. The whole process, however, is more or less a mechanical one. There is no toxin produced and no marked necrosis or degeneration of the cells, the cytological picture in the stool being comparable to what one would expect were the surface of the gut scraped with a knife.

Bacillary dysentery, however, is essentially a toxic condition. Two toxins appear to be elaborated, one acting on the lower bowel and the other on the nervous system. Both toxins are absorbed into the blood stream, but the first is excreted through the large bowel, causing the extensive areas of sloughing necrotic tissue met in the disease. This toxin appears to have a selective action in causing a marked degeneration and necrosis of the mucosal and pus cells, which often present a swollen or hydropic appearance, the nucleus exhibiting marked pyknotic changes.

The cells are further destroyed by a coagulative necrosis following on an exudation which is brought about by the

action of the toxin. The condition produced is comparable to that seen in mercurial poisoning of the bowel.

It is thus seen that a study of the cell picture of the material passed is often of aid in helping one to decide which type of dysentery is present. The question has been more fully dealt with by Captain Willmore, R.A.M.C., and myself in a paper which is awaiting publication.

In the case under discussion cultures were made, but no *bacilli dysenteriae* were isolated.

This again was of little value in helping one to reach a diagnosis, because the *bacillus dysenteriae* is a comparatively delicate organism, and is easily overgrown in cultures by the more vigorous growing *bacillus coli*. I have frequently had to grow cultures on three or four occasions from genuine bacillary dysentery cases before being able to isolate the causative organisms.

Several more specimens were submitted by Dr. Nelson during the following week, but no formed stool could be obtained until ten or twelve days later.

When this was examined the encysted form of *Amoeba histolytica* was found to be present, showing that the case was one of amœbic dysentery.

In making a diagnosis from a microscopical examination of the stool, one must, however, take into consideration local conditions. In Egypt, where my experience of dysentery was gained, a large percentage of all cases, both amœbic and bacillary, as well as many non-dysenteric cases, harboured the *Amoeba coli* in the intestine. I have had little experience of intestinal parasites in Australia, but have never heard of this organism being a common inhabitant of the intestine here. This fact alone should indicate sufficiently the necessity of regarding all cases in which active amœbæ are found to be present in the stool as cases of infection with *Amoeba histolytica*.

I am still unconvinced that the case related by Dr. Nelson was not one of both amœbic and bacillary infection.

Since writing the above, I have seen a second case of dysentery in a man who has resided in Australia for the last four years. He gives no previous history of dysentery, but developed an acute attack about three weeks ago.

I found active amœbæ in his stool, which, however, were more characteristic of *A. histolytica*. He also had a heavy infection of *Trichomonas intestinalis*. I immediately gave him hypodermic injections of 0.03 gm. of emetine hydrochlonde, morning and evening, until 0.72 grammes had been given. The blood and mucus soon cleared up and three stool examinations at the termination of the emetine course failed to reveal the presence of any cysts or amœbæ, so one may assume he is free from his amœbic infection, though the trichomonas was still very much in evidence.

Apparently this second case has been contracted locally.

A further case has just come under my notice of a man who developed a liver abscess. He has never been out of Australia, and gives no history of dysentery. The pus from the abscess was the typical amœbic abscess pus, and cultures from it are sterile. Unfortunately, when I received it, it was some hours old, so that the chance of finding amœbæ in it was slight; none were found. I have not yet examined his stool, but think there is a possibility that he may be harbouring cysts of *Amoeba histolytica*.

BONE CROCHET NEEDLE IN THE ABDOMEN.

Dr. J. G. Edwards has kindly supplied us with a skiagram illustrating a case of a bone crochet needle in the abdomen, reported by Dr. William T. Chenhall in *The Medical Journal of Australia*, of December 8, 1917, p. 476. The reproduction of this skiagram on this page requires no further explanation.

Reviews.

HOSPITAL CONSTRUCTION.

A modern hospital has to be constructed in a manner that will fit the building for its varied purposes. Since these purposes are constantly being extended and modified, the construction of the place where the sick are housed and treated, must also undergo constant revision and modification. Recognizing that there can be no finality in the subject, Dr. Donald J. Mackintosh, one of the highest authorities on hospitals and hospital administration in Great Britain and perhaps in the world, introduces his book on the construction, equipment and management of a general hospital by stating that his work is intended to be a milestone, marking a certain stage in the progress of the theory and practice of his subject.[1] Few men have contributed more than the author to this progress and few have had better opportunities for judging the value of innovations and suggested improvement. In his description of an ideal hospital of the present time, he is naturally influenced to no small degree by the construction and equipment of the magnificent modern institution of which he has been the Medical Superintendent for many years, and which he has planned and shaped in accordance with modern requirements. The book should be in the hands of those who have the task of erecting a hospital and of those who, having charge of an institution for the care of the sick, realize its defects and seek to have them remedied. In its pages the reader will find the justification for each detail in the construction of the several departments of a hospital. The book is written on the plan of fitting the building accurately to the work that has to be carried out within its walls, and not of erecting a well-built, generally useful house and adapting it as well as possible to the many functions of a hospital. The work is profusely illustrated and every picture serves its purpose of revealing details clearly. In addition a series of ground plans are given. We have nothing but praise for this excellent production.

[1] Construction, Equipment and Management of a General Hospital, by Donald J. Mackintosh, M.V.O., M.B., LL.D., F.R.S.E.; second edition; 1916. Edinburgh and London: William Hodge & Company. Royal 8vo., pp. 164, with 52 illustrations and 17 plans. Price, 15s.

The Medical Journal of Australia.

SATURDAY, JANUARY 19, 1918.

Infantile Mortality.

The desire to preserve the lives of as large a number of babies as possible in these days of internecine strife has led those concerned with the public welfare to pay renewed attention to the causes of infantile mortality. The considerable reduction in the death-rate among infants and young children which has been observed in most civilized communities since the beginning of the twentieth century, has raised hopes that a further saving of infant lives can be accomplished. This expectation is based on the consideration of the different mortalities recorded in rural and urban districts. Statistics show that the infantile mortality in cities, industrial centres and mining regions is double that noted in areas devoted to agricultural and pastoral pursuits. It would, therefore, appear that certain factors are operative in crowded portions of countries and are contributing to an infantile mortality which may be regarded as preventable. The Medical Insurance Committee, in a recent report summarized in this issue, point out that less information of the causes of death in the early years of childhood is possessed than of the lethal agencies of later life and that the causes of infantile mortality are probably as varied and multiform as those of adult mortality. If the deaths of infants and young children are occasioned in numerous ways, an improvement in the death-rate will follow from the accumulated knowledge derived from a series of studies dealing with the individual casualties of this period of existence. A better acquaintance with the sources of morbidity will result from attempts to correlate high death-rates in restricted areas with special circumstances accompanying the heightened mortality and from investigations of the physiological development of the infant, which will indicate any liability to suffer from particular morbid conditions during the different stages of growth. A number of exhaustive researches, each dealing in a detailed manner with one of the separate factors concerned, seems to offer an effective means of lowering the infantile death-rate. As soon as the part played by each lethal agency becomes defined, it will be comparatively easy to institute measures to lessen its influence. As the progress of discovery traces the instrumentality of a greater number of conditions, so the infantile mortality will decrease step by step.

RATIONAL THERAPEUTICS.

Drugs are used in medical practice in two ways. The one method of employing them has arisen from a belief that a certain medicament does good in a certain pathological condition. This belief may be so firmly ingrained in the minds of practitioners that students are taught in the medical schools that the treatment of particular diseases consists in the exhibition of drugs or mixtures of drugs, although the pharmacological action of the drugs may fail to modify, remove or ameliorate the changes known to exist. Under rare conditions empiricism may be justified and the treatment elaborated because it appears to benefit the patient may actually do so by attacking the essence of the disease. Mercury was first employed for syphilis in this way, as was quinine for malaria. Research in these cases reveals the mode of action and converts empiricism into rational treatment. It is, however, by no means uncommon for a practitioner to prescribe drugs which have no power to allay symptoms or to cure disease, although they are given for the one or the other of these purposes. Not long ago, Dr. H. C. Wood called the attention of the College of Physicians of Philadelphia to the absence of all pharmacological action of many drugs in common use. He cited lithium in the treatment of gout, aromatic spirits of ammonia when given as a cardiac stimulant, and opium as a local application, among others. The list could be extended very considerably. If preparations of this kind are prescribed because they are harmless and because of their suggestive action, no exception need be taken, but the practitioner should have a clear conception in his mind when employing them as to what they are capable of doing

in the human body. At times drugs are used in so-called pharmacopœial doses for a particular purpose which cannot be attained in this way. For example, quinine and salicylic acid are given for the purpose of attacking the cause of malaria and the cause of rheumatism respectively. Quinine does not kill the plasmodium unless in a concentration of one part in five thousand parts of fluid. It therefore follows that giving half gramme doses by the mouth three or four times a day will never produce this concentration in the blood, even if the medication be kept up for months. In the case of salicylic acid, an affected joint will absorb an effective dose when the blood circulating through the tissues contains the radicle in a concentration of one part in four thousand. For this purpose two grammes of sodium salicylate should be given every hour until 13 grammes have been taken. If the dose be extended beyond this limit, toxic symptoms are produced. It will be seen that the effect of usual doses of sodium salicylate, such as one gramme every four hours, cannot make available for the involved serous surface sufficient radicle to exercise a curative result. Again, difficulty has arisen in regard to the treatment of syphilis by mercury. The success of the treatment must depend on the concentration of active mercury ions in the blood. It would seem that rabbits tolerate mercury in the form of the salicylate or the bichloride in amounts of about 5 milligrammes per kilogram body weight when applied intravenously, while rats tolerate up to 25 milligrammes. If man could be induced to tolerate ten milligrammes of mercury per kilogram body weight, the intravenous dose, calculated as metallic mercury, would be for an average-sized man, about 0.75 gramme. It appears, however, that 0.1 gramme intravenously applied represents a lethal dose. On the other hand, there is reason to assume that mercury in a colloidal condition, or in certain organic combinations, is tolerated in doses of 0.15 gramme. It should thus be possible to obtain a concentration of one part of mercury in 12,000 parts of blood. McDonagh claims that he has obtained good results by driving the intravenous dose of mercury to a high level. It is probable that the spirochaetes attract the metal from solutions of this concentration and are either killed by it or are gravely damaged. The same problem presented itself when Ehrlich introduced salvarsan, and in accordance with his teaching, he recommended the use of doses approaching the toxic dose. Even when a drug is given for the alleviation of symptoms or for reasons other than the cure of a disease, a definite pharmacological action should be aimed at, and the dose adapted to the requirements. The science of materia medica should be the science of toxicology and the prescriber should rely on the appearance of symptoms of drug intoxication, when he employs these means in the treatment of disease. If this practice were adopted, very many of the preparations in the pharmacopœia would disappear altogether and the student would be taught how to employ a drug with safety in doses capable of inducing signs of intoxication. To play with small doses of relatively inert drugs is unscientific and unprofitable.

ARTERIAL DISEASE.

In this issue an account is given of a demonstration by Professor Welsh on diseases of the arteries and their effects. The explanatory address and the subsequent discussion, though curtailed by the inroads of time, were of such a nature as to make it cause for regret that the pathologist and clinician do not foregather more often.

Till recently both have been prone to associate several very different lesions of the arterial tree under the caption of arterio-sclerosis. In emphasizing the distinctions between the various types of arterial degeneration, Professor Welsh's address will commend itself to our readers even though it was impossible in the time allowed to give consideration to all the factors concerned in the production of degenerative arterial changes. So it befell that little or nothing was said of the action of mechanical factors in the production of vascular degeneration. Professor Welsh would rightly attribute all extensive atheromatous change to syphilis. Whilst admitting that this disease is by far the most potent factor in the production of gross atheroma, yet it must be conceded, we think, that mechanical factors in the form of increased strain due to persistently raised blood-pressures, will at times suffice to bring about extensive atheromatous change in the great vessels. This is seen in advanced cases of mitral stenosis, in which, under the influence of an abnormally high pressure in the pulmonary system, very extensive atheromatous disease may be found in the pulmonary vessels. Moreover, the insistence of Dr. Mills on the profound clinical importance of excessive diastolic pressures, indicates another chain of events by which more or less extensive degenerative changes occur in the great vessels. Such excessive diastolic pressures, when long continued, by preventing the full expansion of the *vasa vasorum*,

bring about profound changes in parietal tissues through lack of sufficient nourishment.

From the clinical aspect, Professor Welsh's address serves an exceedingly useful purpose in directing attention to the fact that extensive arterial disease is perfectly compatible with low blood pressures. Arterio-sclerosis is not a disease, but merely a term to describe the varying effects of many different toxins, infections and mechanical factors on the arterial tree, and just as the causes vary, so do their effects upon the vessels. Thus there may be extensive parietal changes in the large and medium sized vessels without any rise in blood-pressure. In the first four decades of life syphilis is the most common causal agent of this type of arterial disease, but as age advances, it is usual to meet with varying degrees of toxic-degenerative change, sometimes very marked in character, in which syphilis has played no part. Such is the decrescent arterio-sclerosis of Clifford Allbutt.

In discussing those forms of arterio-sclerosis associated with heightened pressures, the lecturer emphasized the fact that the morbid anatomist traced the primary change to the arterioles. Whether we seek for an explanation of this arteriolar change in a direct stimulation of the vaso-motor mechanism by subtle katabolic toxins, or attribute it with Broadbent and Osler to the relations of the blood and the tissues, is probably of academic rather than of practical importance. In hyperpietic arterio-sclerosis it is the arterioles that suffer first and most in contradistinction to those types in which the great vessels bear the brunt of the disorder.

It is unfortunate that lack of time precluded the discussion of many points of interest. The lecturer made it clear that his address was not exhaustive, and it is hoped that an opportunity of continuing the discussion will be afforded at another demonstration.

POISONOUS SPIDERS.

Spiders and snakes are frequently maligned by human beings. But as is usual with man, the bad reputation, whether deserved or not, clings with a tenacity of great power. It is commonly supposed that the poison of all poisonous snakes, scorpions and spiders is deadly. Observation has shown that the virulence of the toxins of spiders varies considerably and that nature rarely depends alone on it, as a means of attack or defence. It is not uncommon for people to regard the tarantula (*Lycosa tarantula*) as a highly dangerous neighbour. It has, however, been demonstrated that the bite of this arachnid is neither more painful nor more damaging than that of the expert web-spinner, *Epeira diademata*. But while the fear of ugly varieties of spiders continues to fill the breasts of the country folk almost all over the world without marked justification, there are other species which deserve all the ill that can be thought of them. One of the dangerous genus of spiders is the *Lactrodectus*. One variety of this genus, the lucacha or *Lactrodectus formidabilis*, is well recognized in Peru as a dangerous spider. Another representative of this family is widely distributed in both hemispheres and is not unknown in Australia. It has many aliases. In Italy it answers to the name of *malmignata*, in Saint Domingo it bears the rude pseudonym of *cul rouge*, on account of the red colour of its hind extremity, while in the Antilles it is known as the orange spider. Its proper designation is *Latrodectus mactans*. This little creature has a cephalo-thorax of about three millimetres in length and an abdomen of globular shape, measuring up to 10 millimetres in length. The abdomen is black and has bright red spots dotted over it. A large red spot is found on the dorsum, while a rhomboidal spot is seen close to the anal margin. It is endowed with fine, long, black legs. It affects dry situations and feeds on insects. When seized, the spider emits a greenish fluid from the mouth and a bluish fluid, almost as limpid as water, from the anus. Both fluids are said to be toxic to human beings. It appears to be a quarrelsome creature, but as is the manner of spiders, and of some other of God's creatures, the female is more violent and more destructive than the male. She has an awkward habit of attacking her paramour and making a feast of him, immediately after he has fertilized her. It seems that the poison causes intense local irritation, often leading to œdema, phlegmon and at times gangrene. The general symptoms include fever, depression, somnolence, hæmaturia and, in extreme cases, suppression of urine and collapse. The poisoning is rarely fatal, but the illness may be severe and is always painful. Dr. E. Escomel records three instances of the bite of this spider and advocates the local application of potassium permanganate, as well as internal exhibition of the same substance, as an efficacious remedy in the absence of a specific antivenin.[1] He also records the histories of a series of cases of bite from the "pruning spider" (*Gliptocranium gasteracanthoides*), which is a more dangerous spider. The symptoms of poisoning by this spider are similar to those of the orange spider, although nervous stupor is more marked. While there is no need to awaken public alarm by a warning of the possible danger arising from the bite of these and other spiders, it may be well for medical practitioners to remember that permanganate of potash should be applied promptly when signs and symptoms of poisoning present themselves.

DR. BARNARDO'S HOMES.

We have received a booklet, entitled "Britain's Greatest Need," from Dr. Barnardo's Homes. It is pointed out in its pages that the old poster of the early war days—Your Country Needs You—is now addressed to the babies, and that its claim upon them is as vital as its claim then was upon Britain's potential fighting men. The children are the workers of to-morrow, and they, and they alone, can refill the empty ranks of citizenship. The managers of Dr. Barnardo's Homes have the self-imposed task of assuming the position of a parent to the vast army of destitute children. During fifty years, Dr. Barnardo's Homes have formed the safe haven of no less than 84,000 children. The British armies contain 10,264 Barnardo boys, many of whom have proved their value in the field of battle. Sergeant Hickey, of the 4th Canadian Battalion, who won the Victoria Cross, was a Barnardo boy. Of four Anzacs mentioned in des-

[1] *New Orleans Medical and Surgical Journal*, December, 1917.

patches for bravery at Gallipoli, three were Barnardo boys. Two of these three have been awarded the Military Medal, while 13 other Barnardo boys have gained the same distinction, and one has received the Distinguished Service Medal.

The number of boys and girls admitted to "the greatest family in the world" since the beginning of the war is 5,033. The managers are prepared to take charge of thousands more. They have the opportunities and the machinery, but not the financial means. Gifts of all kinds, money, food, clothing etc., will be welcomed by the Honorary Director, Mr. William Baker, M.A., LL.B., at Headquarters, 18-26 Stepney Causeway, London, E. 1.

Naval and Military.

CASUALTIES.

The 378th and 379th lists of casualties, which were issued on January 9, 1918, contain the names of two medical officers. Captain Henry Dolman and Captain Samuel Herbert Seccombe are reported to have been wounded. Both officers are remaining on duty.

HONOURS.

Among the recipients of the various grades of the Order of the British Empire announced in the *London Gazette* of January 7, 1918, there are five medical men.

Lieutenant-Colonel J. H. Anderson, Deputy Assistant Director Medical Services of the 3rd Australian Division, has been created a Commander of the Order of the British Empire. Lieutenant-Colonel W. T. Hayward, C.M.G., Officer Commanding the 1st Australian Auxiliary Hospital, Major L. O. Betts, Senior Medical Officer of the No. 2 Command Depôt, and Major H. B. Lewers, Deputy Assistant Director Medical Services at Administrative Headquarters, have been created Officers of the Order of the British Empire, and Major W. H. Tofft, of the No. 4 Command Depôt, has been created a Member of the Order of the British Empire. Two dental officers of the Australian Army Medical Corps have also been made Members.

APPOINTMENTS.

The termination of the appointment of Major (temporary Colonel) E. S. Stokes as Principal Medical Officer of the Second Military District, of Lieutenant-Colonel G. Lane Mullins as Officer Commanding the No. 4 Australian General Hospital, and of Captain (temporary Major) F. E. Wall as Registrar at the No. 4 Australian General Hospital, is announced in the *Commonwealth of Australia Gazette*, No. 4, of January 12, 1918.

Captain F. N. Rodda, of the 1st Field Ambulance, is recovering from a severe attack of pneumonia, contracted while on duty at the front. He has been detailed for a trip to Australia on transport duty, and is expected to arrive in Sydney shortly.

We regret to record the death of Dr. Ronald McLean Stokes, of Selwyn, Queensland, from enteric fever, on December 18, 1917.

University Intelligence.

THE UNIVERSITY OF WESTERN AUSTRALIA.

At the December meeting of the Senate of the University of Western Australia, the Chancellor, Archbishop Riley, raised the question whether the whole of the proceedings of that body should be reported in the press. It was determined that the matter should be left to the discretion of the Chancellor. Sir Walter James gave notice that he would move at the next meeting of the Senate:—

> That the previous resolution of the Senate be rescinded, and that the press be allowed to attend and report meetings of the Senate.

It was reported that an agreement had been concluded between the Executor of the Hackett estate and the University in regard to the endowment of the Chair of Agriculture,

A letter of congratulation was ordered to be sent from the University to Mr. R. R. Kahan, B.Sc., on his appointment to the position of Deputy Master of His Majesty's Mint in Bombay.

The remainder of the meeting was taken up with the consideration of school certificate examinations, matters connected with music, the conferring of degrees and kindred matters.

Public Health.

NEW SOUTH WALES.

The following notifications have been received by the Department of Public Health, New South Wales, during the fortnight ending January 5, 1918:—

	Metropolitan Combined District. Cs.	Dths.	Hunter River Combined District. Cs.	Dths.	Rest of State. Cs.	Dths.	Total. Cs.	Dths.
Enteric Fever	14	1	3	0	17	1	34	2
Scarlatina	22	0	0	0	6	0	28	0
Diphtheria	68	4	4	0	30	2	102	6
C'bro-Spl. Menin.	0	0	1	0	1	0	2	0
Poliomyelitis	0	0	1	0	0	0	1	0
*Pul. Tuberculosis	25	14	4	4	0	1	29	19
Malaria	1	0	0	0	1	0	2	0

* Notifiable only in the Metropolitan and Hunter River Districts, and, since October 2, 1916, in the Blue Mountain Shire and Katoomba Municipality.

VICTORIA.

The following notifications have been received by the Department of Public Health, Victoria, for the fortnight ending January 5, 1918:—

	Metropolitan. Cs.	Dths.	Rest of State. Cs.	Dths.	Total. Cs.	Dths.
Diphtheria	80	3	56	2	136	5
Scarlatina	37	6	45	0	82	3
Enteric Fever	6	0	27	1	33	1
Pulmonary Tuberculosis	36	18	17	10	53	28
Poliomyelitis	8	—	0	—	8	—
C'bro-Spl. Meningitis	2	—	0	—	2	—

QUEENSLAND.

The following notifications have been received by the Department of Public Health, Queensland, during the week ending January 5, 1918:—

Disease.	No. of Cases.
*Diphtheria	29
Pulmonary Tuberculosis	15
Enteric Fever	19
Scarlatina	7
Cerebro-spinal Meningitis	1
Erysipelas	1
Malaria	1

* One case returned as membranous croup.

SOUTH AUSTRALIA.

The following notifications have been received by the Central Board of Health, Adelaide, during the fortnight ending December 29, 1917:—

	Adelaide. Cs.	Dths.	Rest of State. Cs.	Dths.	Totals. Cs.	Dths.
Diphtheria	3	0	25	3	28	3
Morbilli	0	0	5	0	5	0
Pulmonary Tuberculosis	9	3	2	5	11	8
Scarlatina	5	0	2	0	7	0
Enteric Fever	0	0	5	0	5	0
Pertussis	0	0	11	0	11	0
Erysipelas	0	0	3	0	3	0
Puerperal Fever	0	0	1	0	1	0

TASMANIA.

The following notifications have been received by the Department of Public Health, Tasmania, during the week ending December 29, 1017:—

Disease.	Hobart. Cases.	Launceston. Cases.	Country. Cases.	Whole State. Cases.
Diphtheria	2	4	14	20
Pulmonary Tuberculosis	1	0	2	3
Enteric Fever	1	0	0	1

NEW ZEALAND.

The following notifications have been received by the Chief Health Officer, Department of Public Health, Hospitals and Charitable Aid, New Zealand, for the four weeks ending December 10, 1917:—

Disease.	No. of Cases.
Scarlatina	157
Diphtheria	417
Enteric Fever	47
Tuberculosis	117
Cerebro-spinal Meningitis	2
Poliomyelitis	3
Erysipelas	6
Puerperal Septicæmia	9
Hydatids	2
Ophthalmia Neonatorum	2
Septicæmia	1

Hospitals.

ST. VINCENT'S HOSPITAL, SYDNEY.

The annual report of St. Vincent's Hospital, Sydney, for the year 1916, which was presented to the subscribers at the annual general meeting held in May of last year, has been issued in book form, together with certain reports and other information.

During the course of the year, 2,999 persons were admitted to the Hospital, while 2,836 were discharged cured, relieved, or unrelieved. The number of those who died was 147. In 16 cases the death took place within 24 hours of admission. The total mortality, calculated in the usual manner, is 4.9% and not 4.6%, as stated in the report, while the case mortality, excluding those patients who died within 24 hours of admission, was 4.4% and not 4.1%.

The number of patients treated in the Out-patient Departments was 32,343, including 7,446 who were admitted for casualties, 6,265 in the Medical Out-patient Department, 4,092 in the Surgical Out-patient Department, 4,790 in the Massage and Electro-therapeutical Department, 4,325 in the Ophthalmic Department, 2,630 in the Ear, Nose and Throat Department, 1,579 in the Skin Department, 813 in the X-ray Department, 227 in the Mental and Nervous Diseases Department, etc.

The changes in the staff include the resignation of General Sir W. D. Campbell Williams, K.C.B., from his position as Honorary Consulting Surgeon, the resignation of Dr. Cyril Shepherd from his position as Honorary Assistant Ophthalmic Surgeon, and the appointment of Dr. N. D. Royle to the position of Honorary Orthopædic Surgeon to Out-patients.

In the annual report itself, there is a complete Roll of Honour with subdivisions "Medical," "Nurses," "Masseurs" and "Lay Staff," while appended to the report are appropriate notices concerning the excellent achivements on active service of Matron Cashin, of Nurse Nance O'Neill and of Nurse Marie Macken. In addition, there is an obituary notice of the career of the late Roger Forrest Hughes.

In the department of Pathology and Vaccine Therapy 46 persons were treated with tuberculin and 80 with various forms of vaccines. No information is given as to the immediate apparent result of the treatment. Blood examinations were carried out in a surprisingly small number of cases, and the chemical examination of the urine in a still smaller number. Bacteriological investigations and the examination of pathological specimens were numerous.

In the Ophthalmological Department a large amount of important work was conducted. From the report of the masseuse in charge of the Massage and Electro-therapeutical Department it appears that massage and hot air treatment has been applied freely, with very satisfactory results. In 732 instances, ionization has been resorted to. No information is vouchsafed as to the effect of this treatment. During the course of the year 10 massage students were trained in the Hospital and nine received their certificates.

The only point of note contained in the report on the work of the Dermatological Department is a complaint that, for various reasons, difficulty was experienced in obtaining X-ray treatment for various skin diseases.

In the Radium Department 101 patients suffering from rodent ulcer and vascular nævi, were successfully treated. The value of this Department must be considerable.

In the Radiographic Department a large amount of diagnostic work has been conducted. The equipment has been brought up to date by the installation of a modern radiographic table and the provision of Coolidge tubes, etc.

Appended to the report is a nosological return arranged according to the Bertillon classification, a table showing the ages of the patients suffering from the various groups of diseases and another showing their religions, as well as two tables giving information concerning the operations performed during the year. The information contained in these statistics will be found of use for various purposes.

MATER MISERICORDIÆ PUBLIC HOSPITAL, SYDNEY.

The annual report of the Mater Misericordiæ Public Hospital, North Sydney, for the year 1916, has been issued in book form. The publication includes a number of good illustrations, a short report by the Sisters of Mercy, the financial statement, a few statistics and a list of subscriptions and donations. Although the Hospital contains 63 beds, no resident medical officer was engaged prior to June, 1916. The average number of patients in the Hospital was 60.2. During the year 1,231 patients were admitted. The total number of those discharged was 1,185, while 48 patients died. The percentage of deaths, calculated by the Registrar-General's formula, was therefore 3.89, and not 3.4, as stated in the report.

Dr. M. Veech resigned his position of Honorary Assistant Surgeon, and was appointed Honorary Dermatologist. Dr. P. Murray-Curtis and Dr. J. F. Deakin were appointed Honorary Assistant Surgeons, and Dr. Alexander Dunn was appointed second Honorary Aural Surgeon. Mention is made in the report of the fact that Dr. J. H. Phipps, one of the Honorary Assistant Surgeons, had been awarded the Distinguished Service Order while on active service.

According to the balance sheet, the income of the Hospital amounted to £5,486 8s. 2d., which, together with the balance brought forward from the preceding year, made up a total of £5,553 13s. 2d. available for current expenses. The income was derived from charitable gifts and donations amounting to £2,562, patients' fees amounting to £1,614, a Government subsidy of £1,200 and nurses' premiums aggregating £110. The expenditure amounted to £2,968 13s. 5d. The Treasurer has carried over a balance of £25, after having transferred £2,560 to the Commonwealth Bank. In the body of the report the expenditure is given as £5,553 13s. 2d. This sum, however, includes the balance and money invested. It is further stated that the cost per bed per annum was £77 1s. 8d. As a matter of fact, £2,969 spent on the Hospital during the year, with an average of 60.2 beds in occupation, would give the cost per bed per annum at £49 6s. 4½d. We congratulate the Hospital on its flourishing finances.

From the table giving the various diseases under treatment, it appears that 19 patients were treated for enteric fever with one death; 18 patients were treated for various forms of tuberculosis with two deaths and six "recoveries"; 42 patients were treated for pneumonia with six deaths; 13 for broncho-pneumonia without any deaths; 15 for diarrhœa and enteritis without any deaths, and 16 for acute articular rheumatism with one death. There were 28 cases of cancer, of which two proved fatal during the year, four of exophthalmic goître with one death, and three of diabetes without a death. There were 60 patients under treatment for appendicitis. Of these, 55 recovered, three died and two were still under treatment at the end of the year. Among the puerperal conditions dealt with, there were 26 cases of puerperal septicæmia with two deaths, one fatal case of puerperal albuminuria and 17 "other accidents of childbirth," with one death. Apparently, venereal diseases are not dealt with at the Hospital.

Abstracts from Current Medical Literature.

SURGERY.

(22) Repair of Cranial Defects.

Woodroffe (*Brit. Journ. Surg.*, July, 1917) reports a method of cranioplasty by autoplastic rib cartilage grafts. He claims that the operation is safe, simple and unaccompanied by shock. Visible pulsation, impulse on coughing, and definite bulging are indications for the operation which frequently improve the headache, vertigo, insomnia and blurred vision present in these cases. In the frontal region the operation may be required for purely cosmetic reasons. Contra-indications are increased intracranial pressure and the presence of sepsis. The size of the gap is no bar to the operation. A crucial incision is made over the gap and the island of scar tissue excised. If the *dura* is opened, it is closed immediately, a muscular or fascial graft being used, if possible, to reinforce the suture. The edges of the aperture are cleared until the rugine can be swept round between the bone and the *dura*. With a gouge forceps all rough edges are removed. A swab wrung out in hydrogen peroxide, is then placed in the wound, and a flap turned down to expose the fifth, sixth, seventh and eighth rib cartilages. Shavings are cut from these with a special knife. Fine catgut sutures are run between the pericranium of opposite edges to form a trellis work in which are swung the cartilage shavings with their cut surfaces outward to avoid adhesions to the *dura*. Perfect hæmostasis is essential. It is not known whether the ultimate fate of the grafts is ossification.

(23) Bony Ankylosis.

Three cases of bony ankylosis of the jaw are recorded by W. P. Carr (*Surg. Gynec. and Obstet.*, October, 1917). Two of them followed injuries to the chin, and the third suppuration of the ear. There was no line of demarcation between zygoma, mandible and base of the skull. At that time the writer did not know of Murphy's operation, and after resection of the bone did not interpose any tissue between the cut surfaces of the bones; yet the results have been good and permanent. The greatest difficulty was in overcoming the contraction of the masseter and internal pterygoid muscles, which kept the jaws rigid, even after removal of the bone. This muscular contraction was overcome by the use of lead expansion screws and small dental jack screws placed between the molar teeth. The parotid is likely to be injured and the resulting parotid fistula may persist for weeks. No facial palsy resulted, but the internal maxillary artery was cut on one occasion and required ligaturing. Carr recommends Murphy's periosteotome retractors as ideal for protecting the soft parts, and considers the interposition of temporal fascia a safeguard against failure, provided it is protected against pressure by means of a wedge between the teeth.

(24) Gunshot Fractures of the Thigh.

In a review of 125 gunshot fractures of the thigh, Max Page and Mesurier (*Brit. Journ. Surg.*, July, 1917) consider the Thomas's knee splint the best for transport. It gives good alignment in fractures of the middle third, but in the lower third a double inclined plane is preferable, and in the upper third, a "Hodgen." They prefer ordinary strapping to Huessner's gum for extension purposes, and have found anklet extension attachments, with plaster of Paris or leather, unsuitable, owing to the sores which form over the bony prominences. The Jones's method of obtaining extension in a Thomas's knee splint is unsatisfactory. Extension from transfixion pins through the condyles is indicated in special cases only. The Wallace-Maybury splint is cumbersome and expensive, and its foot-piece throws too great a strain on the calf muscles. The wounds were packed with dry sterile gauze, and if there was no posterior drainage, an incision was made on the posterior aspect between the hamstrings and the vastus externus. There were 11 cases of primary nerve involvement, and 3 of injury to the main vessels. Secondary hæmorrhage occurred in 17 cases with 2 deaths, the average time of the hæmorrhage being 19 days after the injury. The vessel was ligatured in the wound in two cases, and packing alone was used in nine. In 30 cases pyrexia was attributed to osteitis, and in 23 sequestra were removed. Out of five cases of tetanus three were fatal. There were four amputations, two for secondary hæmorrhage, and one for spreading gangrene.

(25) Caecostomy in Septic Peritonitis.

The rational treatment of septic peritonitis, according to Nyulasy (*Brit. Journ. Surg.*, July, 1917), demands the removal of the unabsorbed toxins which so frequently cause death, even after relief of the obstruction has been obtained. He accomplishes this by means of caecostomy. If caecostomy does not relieve the symptoms quickly, he has no hesitation in draining the intestine higher up. Hourly records are taken and continuous saline infusion and electric light baths employed before this second operation is embarked upon. He uses local anæsthesia. The upper abdomen is opened and a distended loop of the small gut drained by rubber tubing fixed with a purse string. In the cases in which a caecostomy is done, the fæces rush out under high pressure. He does his caecostomy through an oblique incision, isolating a fold of the caecum with a clamp, and after packing off his abdomen fixes a rubber tube with a purse-string suture. A second purse-string anchors the caecum to the peritoneum. The tube becomes loose in about four days. If a fistula persists, it can be closed subsequently.

(26) Free Bone Transplants.

A preliminary report on his investigations of free bone transplants is made by Tsunehara Todyo (*Surg. Gynec. and Obstet.*, June, 1917). All his experiments were made with the epiphyseal line in growing dogs. Under strict asepsis the entire radius was removed and replanted in the same dog. The experiments were completed in 11 to 65 days, and then the transplants were removed, fixed, sectioned and stained. In the main, the writer holds that Barth's statement that the transplant loses its vitality and is replaced by newly built bone tissue, is extreme. The periosteum can certainly live and has an important bearing on the subsequent architecture of the bone. The fact that transplanted grafts without periosteum can regenerate may be due to the activity of the cells of the cambium layer, but regeneration of transplants without periosteum is always delayed. In the writer's experiments, the bone cell lost their nuclear stain, but some of them retained it as long as 65 days. The marrow cells lost their nuclear stains but were under the disadvantage that the closed medullary cavity in these experiments allowed no opportunity for vascularization. In the central ossified part of the epiphysis, the bone cells lost their nuclear staining, but most of the cartilages in the periphery lived and grew. Sometimes the epiphysis became irregular, but the proliferation of cartilage cells, the ossification of the matrix, and the enlargement of the epiphysis continued. The epiphyseal line is one of the resistant tissues; a small part of it conserved its direction phenomenon, but the main part grew irregularly. This explains why the increase in thickness of these grafts is marked, and why failure of growth in the long axis is pronounced.

GYNÆCOLOGY AND OBSTETRICS.

(27) Bleeding in Pregnancy.

R. S. Titus (*Boston Med. and Surg. Journ.*, September 20, 1917) gives a general survey of bleeding in pregnancy and its treatment. He divides it into three stages: (1) During the first three months of pregnancy the conditions with which uterine bleeding are associated are (*a*) miscarriage, (*b*) cervical polyp, (*c*) ectopic pregnancy, (*d*) carcinoma of the cervix, and (*e*) hydatid mole. (*a*) Threatened miscarriage should be treated by rest in bed and morphine without vaginal examination. For inevitable abortion with part of the products of conception still *in utero*, curettage is advised, but he advocates little or nothing to be done for complete miscarriage, except rest in bed to favour involution. He recommends the treatment of septic miscarriage without bleeding to be distinctly conservative, as there is vast harm done by too much intra-uterine manipulation. He admits that in septic cases with bleeding curettage should be employed, but advises finger rather than instrumental cu-

rettage. (*b*) The treatment of cervical polypus is excision. (*c*) In the case of ectopic gestation he advises that, when serious doubt exists, it is better to explore the abdomen. In the case of severe collapse with external hæmorrhage, he waits until the patient recovers before performing the laparotomy. (*d*) With regard to carcinoma of the cervix, when in the operative stage the growth should be treated as though there were no pregnancy, by radical hysterectomy. On the other hand, if pregnancy exists along with an advanced case of carcinoma, there is no advantage in sacrificing the baby, as there is nothing to be gained for the mother by so doing. At term Cæsarean section without doubt is the operation of choice to secure a viable child. (*e*) Hydatid mole, after the diagnosis has been made and proved, should be removed and the patient carefully watched for any future development of chorio-epithelioma. (2) During the second three months of pregnancy, miscarriage, threatened or complete, is really the only important condition associated with hæmorrhage which may arise except everted eroded cervices, and its diagnosis is easily made on inspection. For threatened miscarriage during this period he advises rest in bed and morphine. If these means are not successful, labour will advance, and unless the placenta does not come away, nature may be left to herself. (3) In the last three months the conditions associated with bleeding are (*a*) premature labour, (*b*) ruptured varicosities, (*c*) *placenta praevia*, and (*d*) detached placenta. (*a*) Threatened premature labour should be treated by morphine, and if not successful the case should be left to nature and treated as any case at term. (*b*) For varicosities which may be anywhere inside the vagina and labia, he advises pressure, an occasional ligature, rest in bed and a quiet life. He regards *placenta praevia* and separated placenta as the true surgical emergencies of obstetrics, and describes their types and treatment in detail. (*c*) After diagnosis the treatment of *placenta praevia* depends on the stage of pregnancy and the parity of the patient and the condition of the cervix, whether the bleeding still continues or has ceased, and whether the patient is in labour or not. A complete *placenta praevia* in a primipara in the seventh month with active bleeding requires immediate treatment. He advises against rapid *accouchement forcé*. He states that the rubber bag intra- or extra-ovular is used in some clinics with excellent results. Vaginal Cæsarean section up to seven and a half months or eight months is an operation of great value in conditions requiring haste. It cannot be used if the placenta is on the anterior wall. The delivery after section is accomplished by version. Abdominal Cæsarean section is the quickest, is attended by the least loss of blood and gives the very unstable fœtal life its best chance. For a complete *placenta praevia* in a primipara in the seventh month, in labour, with the cervix soft, taken up and partly dilated, he recommends the Braxton Hicks' method or the bag as the best means. A complete *placenta praevia*, in the seventh month, in a primipara, when bleeding has ceased, should be treated expectantly with rest in bed with the hope of tiding the pregnancy until the eight months for the sake of the baby. It can then be removed by abdominal section. A multipara with a complete *placenta praevia* in the seventh month, actively bleeding, should be emptied immediately, by one of the methods above mentioned. If the patient be in labour and there is any dilatation of the cervix, the vaginal route is best to deliver. For complete *placenta praevia* in a primipara not in labour, in the eighth month, when there is active bleeding, he recommends laparotomy as the operation of choice. When the patient is a multiparous woman, he recommends the immediate emptying of the uterus. The operation to be chosen will depend upon the state of the cervix. If this be rigid with scar tissue, the abdominal route is the safest and ensures a living baby. If the cervix is soft, the vaginal route may be taken. Complete *placenta praevia* in a primipara at term before the onset of labour, when bleeding is present, is best treated by laparotomy. In a multipara it is best treated by a laparotomy; no matter how soft the cervix is, much blood will be lost in any vaginal manipulation. For a partial *placenta praevia* in a primipara not in labour, with active bleeding, he recommends the bag attached to which is a 1 kilogram weight. Whether laparotomy is indicated will depend upon how great an area of cervix is occluded by the placenta. Partial *placenta praevia* in a primipara in labour in the eighth month will be treated according to the degree of dilatation; the bag will fill all requirements and laparotomy is usually unnecessary. When partial *placenta praevia* is diagnosed in a primipara not in labour when bleeding has ceased, the patient should be kept quietly in bed in the hospital until bleeding again appears, and then the choice of operation will depend upon the amount of loss, and the condition of the cervix. Cæsarean section has much to be said in its favour. Partial *placenta praevia* with bleeding in a multipara not in labour, necessitates an immediate emptying of the uterus. The more conservative bag procedure will yield the best results. He does not regard the abdominal route as justified in this type, unless the cervix is so full of scar tissue that it cannot dilate. If the multipara be in labour and has a partial *placenta praevia*, some vaginal operation is indicated. Partial *placenta praevia* in a primipara at term, not in labour, may be treated by the bag or by Cæsarean section. Partial *placenta praevia* in a primipara in labour will be treated according to the dilatation and character of the cervix. Partial *placenta praevia* in a multipara at term, not in labour, with active bleeding, should be treated entirely according to the state of the cervix. He advocates the bag for these cases rather than any more radical operation. Marginal *placenta praevia* is the least serious of the three types of *placenta praevia*. Bleeding rarely sets in before labour starts at full term. The bag is the best means for dilating. (*d*) Regarding separated placenta, he believes that some degree of detachment must be more common than is generally supposed, and if the bleeding is not severe no operative interference is necessary. Williams attributes the separation of the placenta to the degeneration of the small vessels. He recommends Cæsarean section in a primipara, not in labour. If the primipara is in labour when the condition arises, the dilatation and the condition of the cervix will be the determining factors as to what operation to use. In a multipara not in labour all depends again upon the cervix. If it be soft and one that will dilate easily, the vaginal route may be chosen. If a multipara be in labour, unless the cervix be very resistant, the vaginal route is quite safe; the bag, however, is contra-indicated. The uterus must be emptied when there is partial detachment of the placenta, even if labour has not begun. Laparotomy is better for the primipara and safer for the multipara if the cervix be rigid. If the condition first appears when the patient is in labour, the character of the cervix will again determine the method to be chosen. Cases of partially detached placenta when seen after bleeding has ceased and the diagnosis of *placenta praevia* has been excluded, may be left quite alone.

(28) Smallpox in Utero.

W. A. Rothwell (*North-West Med.*, September, 1917) reports a very extraordinary case of smallpox *in utero*. The husband and wife, who was pregnant about three months, slept in a bed which had been occupied by a young man afflicted with mild smallpox. The husband developed severe smallpox and the wife and children were immediately isolated and successfully vaccinated. The mother especially gave a typical reaction. Quarantine was raised in six weeks, and one month afterwards the author was called to see the mother. Upon examination he found no signs of life in the fœtus and the *os* was dilated about the size of a quarter. The vagina was aseptically packed and a six and a half months' mummified fœtus was expelled about 12 hours later. Life must have been extinct for some time, as the abdomen was discoloured and distended, and the abdominal muscles and integument were very thin and fragile. What was most noticeable, however, was the presence of round, yellow pitted scars, about the size of the end of a lead pencil, distributed over the whole surface of the body where the scabs had become detached *in utero*. Vesicles and pustules were also present. The mother had not had a rash, but had had a normal vaccination reaction.

INFANTILE MORTALITY.

The Medical Research Committee, formed in connexion with National Health Insurance in Great Britain and Ireland, has issued a pamphlet dealing with the mortalities of birth, infancy and childhood. The Committee point out that their report consists of a series of memoirs indicating future lines of research and does not give an account of an enquiry carried to completion. The studies show the variety and complexity of the separate factors whose composite effects are summed up in the total annual death roll of babies and children. The Committee believe that the multiplication of reports in repetition or amplification of the returns of the Registrar-General can serve no other purpose than that of maintaining public interest. In the opinion of the Committee information, likely to be useful for devising means of lessening the preventible infantile mortality, may be obtained by analyses of the external conditions, associated historically and topographically with different rates of mortality, and by investigations of the particular physiological and pathological processes of the unborn babe, the infant and the child, conducted so as to show that external conditions are most likely to influence each stage in an unfavourable manner.

Dr. A. K. Campbell contributes a historical note on the causes of death in early life. The older records in connexion with burial grounds give much information about the civil conditions of those buried but little about disease. The ages of the dead are not mentioned. By 1730 the London Bills of Mortality inserted age, but not always the cause of death. In 1835 J. R. Edmonds, of Cambridge, constructed a table from the London Bills of Mortality showing the number of those dying under 5 years per 100 born in several periods from 1730 to 1829. The rate fell from 74.5 per 100 born in the interval of 1730 to 1749 to 31.8 in the 19 years from 1810 to 1829. The rate for the years 1911 to 1915 has fallen to 16.8. Registration of deaths dates from 1841, and the Registrar-General's reports from 1838. The diminution in child mortality over a period of close on two centuries has been such that the rate has fallen about 77% since 1730. The period in which the rate has fallen covers practically the whole of the industrial development of modern times, the concentration of population in towns and the growth of cities to an almost unmanageable size. Despite these influences, usually regarded as adverse to infant life, the movement in child mortality is towards reduction. Deliberate effort to conserve infant lives seems to date from 1875 with the recognition of the contrast which the movement of the death-rate of infants presents with that of the general death-rate. The statistical studies made since 1875, have shown that deaths of infants are not equally distributed throughout the several months of the first year. Deaths occurring during the first month form about one-third of all the deaths taking place in the first year; while fully one-half of the deaths occurring in the first month take place during the first week. During the last 40 years there has been a diminution of infantile mortality due to a lessening of the death-rate in the six to twelve months' period of the first year and to a less extent in the three to six months' period. There seems to have been improvement in the post-natal conditions causing death towards the middle and end of the first year, but little or no improvement in the ante-natal conditions leading to the morbidity of the first month of life.

Dr. Wm. A. Brend deals with the relative importance of pre-natal and post-natal conditions as causes of infantile mortality. His memoir is divided into three parts. The first part is concerned with the association of infantile mortality with environment, the second examines the pathological processes and the third part contains an attempt to discover the reason for the decline in infant and child mortality. It may be assumed that some loss of life in the first year of existence is unavoidable, but there is no way of ascertaining the extent of this "natural" death-rate. Attention may be directed to the lowest rates of infantile mortality in the British Isles. A table dealing with 3,500,000 persons scattered throughout England, Scotland and Ireland records communities with infantile mortality rates from 40 to 60 per 1,000 births. In 1914, the births in the United Kingdom numbered 1,101,836 and the number of deaths under one year of age was 114,591. The infant death-rate was 104 per 1,000 births. On the assumption that a rate of 50 deaths per 1,000 births represents the unavoidable loss, the number of preventable deaths in the first year was 55,092. A table dealing with 8,000,000 persons living in cities and towns shows mortalities from 122 to 184 per 1,000 births in those districts with high rates. In Ireland it is possible to collect figures of the mortality in "civic unions," which are areas containing towns with more than 10,000 inhabitants. The infantile mortality among 1,600,000 persons residing in "civic unions" is 120, while the infantile mortality for the rest of Ireland with a population of 2,700,000, is only 64. Similar figures can be obtained for France. The infantile mortality in towns of 5,000 persons or more amounts to 111 among 15,200,000 persons, while the infantile mortality is 58 for the rest of France with a population of 24,000,000 persons. The figures for England and Wales do not show the same distinction, as the classification into "urban" and "rural" districts for registration does not involve the usual meaning of these terms. Mining towns with populations of 65,000 persons are included in the rural districts, and the high death-rates among the infants in these small towns masks the difference in the death-rates in the two classes of communities. The author concludes that infant mortality is essentially a result of urbanization. He mentions how widely various writers differ in regard to the factors responsible in cities for the deaths of infants. Some writers regard the infantile mortality as the most sensitive index of social welfare and sanitary administration. Others hold that the lethal influence is the ignorance of the mother, and the remedy is her education. Poverty is often considered as a reason for much infantile mortality, yet the lowest death-rates of infants in the United Kingdom are seen among the peasants of Connaught, the crofters of the Highlands and the agricultural labourers of Wiltshire. In these areas the conditions of housing, drainage and food supply are not those usually looked upon as good. The industrial employment of women has been suggested as a reason for the high infantile mortality in the county boroughs of the north. Detailed statistical investigations by the author give no support to this view. While breast-feeding is an important factor in maintaining the health of infants, there is no reason to suppose that the difference in the infant death-rates in towns and in the country is due to any alteration in the proportion of mothers feeding their young on the breast. The author notes that in certain districts with high infantile death-rates, breast-feeding is practically universal.

Dr. Brend makes a special study of those pre-natal conditions which have been suggested as associated with high infantile mortality. Syphilis seems to be the only disease more prevalent in towns than in the country and, even in cities, it only appears responsible for an infantile mortality of 1.5 per 1,000 births. The death-rate in the first month is little influenced by social factors, but the death-rate in the subsequent months appears to be higher in the "poorer districts." The death rates are low among infants with fathers belonging to the upper or middle classes or occupied as agricultural labourers or shopkeepers, and it is high among those with fathers belonging to the groups, textile workers, unskilled labourers and miners. The author believes that a polluted state of the atmosphere is the main cause of high infantile mortality, and gives figures showing that the weight of solids deposited from the air is higher in all districts with high infant and child death-rates.

According to Dr. Brend the pathological causes for infant deaths fall into three main groups, respiratory diseases, mainly pneumonia and bronchitis, epidemic diarrhœa and enteritis and developmental diseases and malformations. The excess of infantile mortality in the county boroughs of the North of England over that in the rural districts of the South is due to the increased number of deaths caused by respiratory diseases and by diarrhœa and enteritis. There is little difference in the two regions in the mortalities produced by developmental diseases. A comparison of the tables of the pathological causes of infant deaths in the North of Scotland and the South of England shows hardly any difference, so that climatic influences such as temperature, do not influence the infantile death-rates. Dr. Brend concludes that the dust of the air is responsible for the increase of the mortalities caused by respiratory diseases and diarrhœa in urban districts. In his study of the

causes of the decline in the infant death-rate, Dr. Brend shows that the mortality due to developmental diseases has not diminished in the period for which figures are available. There has been little diminution in the death-rate of children under three months of age. There has been some lessening in the rate for children from three to six months old and more diminution in the rate during the next six months of life. The improvement continues after the first year of life, and is observable in the rates of mortality of children up to five years of age. Analyses of the causes of death in children under five years of age reveals that the saving of lives is occasioned by the lessened mortality from respiratory diseases. The author concludes that two radically different types of deaths are classed together under the term infantile mortality. The first type consists of deaths due to developmental defects, which vary little from year to year, from place to place and from class to class, and appear to be caused by influences which cannot at present be controlled. The second type consists of deaths mainly due to respiratory diseases and enteritis caused by factors in the post-natal environment most prevalent in crowded, smoky industrial and mining centres, and probably entirely preventable.

Dr. L. Findlay deals with the effect of infant welfare schemes and of wages on the infantile death-rate. He finds that little difference is observed in the mortality rates among infants in towns in which Infant Clinics and Milk Depôts have been inaugurated by the municipal authorities and in those in which such institutions have not been utilized. Indeed a study of the apices and dips of the charts of infantile mortality rates in different towns reveals a remarkable similarity in the fluctuations, so that the general improvement in the infant death-rate cannot justifiably be ascribed to the adoption of any particular measure in some towns. In regard to wages the figures show that the infantile mortality is diminished in times of famine and of industrial strife, so that the amount of money available does not account for changes in morbidity. The zymotic diseases and their complications appear to be the chief agents affecting the infantile mortality. In fact the periodicity in the death-rates from these diseases appears to explain not only the variations in the death-rates from year to year, but also the changes in different parts of the country at the same time. Charts are given showing the facts on which this conclusion is based.

Dr. J. Brownlee contributes a statistical study on the changes in the physiological processes of the developing child as shown by its response to different diseases. It appears that the growth of the child is a continuous process from a period at least six months prior to birth to the age of about four years, and that this progress is not interrupted either by parturition or by the act of weaning.

British Medical Association News.

SCIENTIFIC.

A meeting of the New South Wales Branch was held at the Pathological Laboratories, Medical School of the University of Sydney, on December 14, 1917, Dr. R. Gordon Craig, the President, in the chair.

Professor D. A. Welsh gave a demonstration on diseases of arteries and their effects. He pointed out that a good deal of attention had been given to the subject of diseases of the arteries in his Department. He had found it necessary, for teaching purposes, to adopt a working hypothesis concerning the pathology of these diseases. He recognized that the conception he held differed to some extent from the usual teaching, but he claimed that it supplied a satisfactory explanation of the findings in practically every case, and that, in the main, it had received confirmation from other pathologists. It was well known that certain poisons exercised a selective action in regard to the tissues affected. For example, some irritants selected the larger bronchi, while others selected the fine bronchi and bronchioles. In a similar manner, certain irritants and certain poisons had an affinity for the larger arteries, the aorta, the medium-sized arteries, the cerebral and the cardiac arteries, whereas other forms of poison produced their changes on the ultimate arteries, that is, the minute arteries and the arterioles. The two main forms of arterial disease were (1) syphilitic and (2) non-syphilitic. The great cause of disease and damage to the larger and medium-sized arteries appeared to be syphilis. He held that whenever the aorta and the larger arteries were damaged to a material extent, syphilis was the acting cause. Even if the arteries were greatly affected by atheromatous changes, no rise in the blood pressure was necessarily produced. (2) Toxins which damaged the whole system of the ultimate arteries, were never syphilitic. These toxins selected all the small vessels of the body more or less simultaneously and, consequently, a rise of blood pressure occurred in the early stages. Associated with these changes, there was concentric hypertrophy of the left ventricle. The toxins which effected these changes were the so-called metabolic poisons, and, less frequently, bacterial toxins. He was prepared to concede a place among these poisons to alcohol and lead. The kidneys were frequently the seat of primary damage, and it was probable that a disturbance of the internal secretions acted in association. He emphasized the point that a rise in blood pressure could not occur unless all, or nearly all, the ultimate arteries were involved. He reserved the term "arterio-sclerosis" to these changes in the smaller arteries, and in using it, wished his audience to understand that he was speaking of a separate disease entity, originally spoken of as arterio-capilliary fibrosis. He pointed out that the term arterio-sclerosis was used by some authors to cover all conditions in which there was a hardening of the arteries. In using the term, he wished to limit it to one particular disease of the ultimate arteries. In distinguishing between these two large groups of arterial disease, he recognized that both might exist in the same patient. He also made it quite clear that he recognized other forms of arterial disease, although he did not propose to deal with the other forms that evening.

(1) In the first place, he dealt with the effects of syphilis on the arteries. He illustrated his remarks by two schematic drawings. One form of syphilitic change was *endarteritis proliferans*. In this condition the intima was thickened uniformly and the lumen was greatly reduced in size. There was an area of infiltration with lymphocytes constituting a periarteritis. There was no difficulty in understanding and in recognizing this form. Clifford Allbutt described it as a separate arterial disease. When it involved the cerebral arteries, it lead to thrombosis and secondary softening of the brain. The second form of the syphilitic disease of arteries was *endarteritis deformans*, or nodular atheroma. The tissues of the intima were thickened, but there was well-marked degeneration in addition to the inflammatory change. The middle coat was thin and atrophied where the thickening of the intima was maximal. The outer coat, however, was not much affected. In nodular atheroma a syphilitic *endarteritis proliferans* had occurred in the *vasa vasorum*. The nutrition of the vessels was thus affected, and atheroma occurred as a result. In the aorta these changes led to the formation of nodules which softened, broke down and ulcerated. Later on, they became calcareous. There was a local weakening of the wall, and a tendency to the formation of aneurysm. In the brain, the same bulging of the wall might occur. Aneurysms frequently formed in the cerebral vessels, and when they ruptured a subarachnoid hæmorrhage was produced. In other cases, various forms of primary thrombosis and cerebral softening were met with. When the vessels of the heart were affected, there was an interference with the blood supply, leading to primary thrombosis and cardiac infarcts. As in the brain, patches of softening resulted from these changes. In addition, interstitial changes were met with. Professor Welsh pointed out with considerable emphasis that in syphilis the patient did not die of cerebral hæmorrhage in its classical form.

(2) In turning his attention to the pathology of what he termed arterio-sclerosis or arterio-capilliary fibrosis, he stated that the onset was insidious in most cases. The changes were dependent on the development of an irritant toxin, which, in the first place, led to the contraction of the muscular coat. The spasm produced gave rise to a slight

increase in the blood pressure, which passed off, if the toxin were eliminated. Hypertonicity was necessarily present at this stage. When the condition persisted, the muscular coat became permanently contracted and hyperrigidity of the ultimate arterioles resulted, and led to a permanent increase of the blood pressure. In this way a vicious circle was established. The middle coat became damaged, and the thickening which resulted was found to be due to an increase of fibrous tissue. In the later stages the middle coat became degenerated and greatly fibrosed, and there was a secondary thickening of the inner coat. In pure uncomplicated cases of this condition there was a definite symptom complex and pathological complex which were absolutely distinct from those of nodular atheroma. A rise in the blood pressure was invariably present, save in the terminal condition, when the heart gave way. Associated with the progressive rise in the blood pressure and blocking of the arterioles there was a progressive hypertrophy of the left ventricle. This hypertrophy was always seen post mortem. In addition, there was a remarkable condition of the kidneys, which was always present in the later stages. This condition was known as the granular contracted kidney. The renal arteries were damaged, like the arteries elsewhere, only more extensively. He stated that, whatever the origin of the arterial disease, it had some intimate relation to kidney function. If the damage to the kidneys were the primary condition, it always came on as an essential part of the process. He regarded arteriosclerosis as an effect of auto-intoxication. In addition to the chronic inflammatory changes met with in arteriosclerosis, there were secondary changes of the nature of an interstitial overgrowth. The damage in the arterial system, when affecting the vessels of the brain, led to the development of miliary aneurysms and to true cerebral hæmorrhage. At times these miliary aneurysms were also formed in the meninges, and their rupture lead to subarachnoid hæmorrhage.

Professor Welsh, in reply to an interposed question by Dr. Sheldon, stated that he assumed that the metabolic poisons present in the circulating blood, acted directly on the walls of the blood vessels from within. He then proceeded to read various passages in Mott's contribution to Clifford Allbutt's book, to illustrate the difference of views. Before leaving this subject, he stated that the hard walls of medium arteries, frequently described as pipe-stem arteries, were not necessary in arterio-capillary-fibrosis, even when this existed to an extreme degree. Before proceeding to the demonstration of specimens, he made brief reference to the calcification of the middle coat of arteries met with in senile changes. The first series of cases illustated the fact that nodular atheroma might be present in such extreme degree as to cause death, without there being any noticeable evidence of arterio-sclerosis.

The first demonstration was of the organs of a man aged 73 years, who had suffered from extreme atheroma, involving more especially the aorta. The blood pressure was measured shortly before death, and was found to be low. He demonstrated the nodular atheroma of the aorta, a large aortic aneurysm, involvement of the aortic valves and secondary hypertrophy of the left ventricle with dilatation. The kidneys were not granular and were not contracted. In the second case, the patient had died of thrombosis of the cerebral vessels at the age of 47. There was marked atheroma, involving chiefly the lower part of the aorta, and also atheroma of the arteries at the base of the brain. This had led to softening in the pons and other parts of the brain. There was no marked concentric hypertrophy of the left ventricle. In the third case, the patient, a man aged 73 years, had been admitted to hospital for acute retention of urine, and had died after a preliminary cystostomy before the enlarged middle lobe of the prostate could be enucleated. The aorta presented characteristic appearances of nodular atheroma. There was a tumour situated in the kidney, but no signs of any chronic interstitial nephritis. The blood pressure had not been recorded during life.

(2) The second series illustrated the converse position that the most advanced arterio-sclerosis might co-exist with little or no atheromatous change.

A patient, aged 40 years, was admitted to the Hospital in a dying condition. The blood pressure was 135 mm. Hg.. The aorta was practically free from atheroma; there was concentric hypertrophy of the left ventricle of the heart, but no dilatation of any of the cavities. The kidneys showed granular changes in the cortex and cystic degeneration. Professor Welsh explained the low blood pressure as a terminal condition. The next series of organs was derived from a man aged 49, whose blood pressure was 260 mm.. There was very little atheroma of the aorta, the left ventricle was markedly hypertrophied, while the kidneys were granular, with atrophic changes of the cortex. The Wassermann reaction had been carried out and had proved to be negative.

Dr. R. Gordon Craig thanked Professor Welsh for his enlightening demonstration. His conceptions of arterial disease had been much clarified by the demonstration.

Dr. A. E. Mills thanked Professor Welsh for going so carefully and deeply into the question of arterio-sclerosis and atheroma. The term arterio-sclerosis was frequently employed to indicate any form of hardening of arteries. He agreed with Professor Welsh with regard to the desirability for the adoption of distinct nomenclature, and he had been in the habit of using the same terms as Professor Welsh, although the reason for their adoption was somewhat different. He used the term atheroma to indicate those cases in which the endarteritis involved larger vessels. Although it was obvious that atheroma was not always syphilitic, he agreed with Professor Welsh that it was syphilitic in the vast number of cases. He referred to a case of a man who first complained of a heavy feeling in his legs on going to work. Paralysis subsequently developed, and the diagnosis of myelitis was made. A closer investigation of the case had led him to the conclusion that it was one of atheroma and thrombosis. In dealing with the group of cases which Professor Welsh had called arterio-sclerosis or arterio-capillary-fibrosis, he stated that the renal changes preceded the general arterial changes. In the early stages there were signs of hypertonicity. It was possible, during this stage, for the metabolic poison to be eliminated. He referred to the case of an old lady whose systolic blood pressure was 210 mm. Hg., and diastolic blood pressure 120 mm.. There were signs of generalized arterio-sclerosis, and the mitral valve was affected. She was much depressed because she was not allowed to do anything. In another case the systolic blood pressure was 210 mm., and the diastolic 100 to 110 mm.. The patient was suffering from aneurysm. In the third case in which a parenchymatous nephritis was associated with an aneurysm, the systolic blood pressure was 160 mm. and the diastolic blood pressure 80 mm.. Dr. Mills cited these cases, as he held that much important information was obtainable from the records of both the systolic and diastolic blood pressures. In the case of a heavy drinker with a failing heart, the systolic blood pressure was 140 mm., and the diastolic 120. There was sclerosis of the liver and œdema. He had formed the opinion that there must have been arterio-sclerosis, because the diastolic pressure was high. The fact that the heart was failing had led to a lowering of the systolic pressure. He then referred to the case of a man aged 40, who was supposed to have been delicate in his youth. As he became affluent, he began to indulge himself in regard to food, and took very little physical exercise. The result of this over-eating and sedentary life was that he got metabolic poisoning, and his blood pressure rose to 200 mm.. Dieting sufficed to reduce the pressure by 40 mm.. While something could be done for these patients in the early stages, neither the physician nor the surgeon could bring about any improvement later. The case then was one for the pathologist. But even in the advanced stages, the raised blood pressure was at times due in part to the result of spasm. He based this contention on the observation that, when uræmic symptoms and Cheyne-Stokes' breathing were present, the blood pressure frequently fell after the administration of morphine. This suggested that the toxic action affected the vaso-motor system. Boycott had said that it was the business of the heart to maintain the circulation, and that it was the business of the vaso-motor system to regulate the distribution of the blood supply. Just before death, the blood pressure sank rapidly. He agreed with Professor Welsh's explanation of the low blood pressure in his fourth case.

Dr. S. Sheldon spoke of a case of a patient who had consulted him three weeks before. He was a man aged 33

years, and was suffering from paralysis of the right side of the face and of the right leg and arm, and intense headache. His subjective symptoms were said to have lessened, when Dr. Sheldon first saw him. The specific gravity of the urine was scarcely over 1,000. He had been doing hard work, and had been much worried. During the examination an attack came on. The patient was removed to a hospital, and treated by purgation and a milk diet. On admission, the systolic blood pressure was 216 mm. and the diastolic was 180. After four days, the systolic pressure was reduced to 160 mm.. He had left hospital five days before, when he was feeling well. The blood pressure, however, had again reached 216 mm., and there was distinct facial palsy. He regarded the case as one of spasm of the nervous sympathetic system. There was a history of neglected constipation. His own view was that the prospects of this patient were bad. He asked Professor Welsh to state what he thought of the case. He also referred to cases of atheroma affecting the coronary arteries, without any atheromatous changes elsewhere. He had seen this condition in young people, and had noted that they invariably died in a few months.

Professor Welsh considered that in Dr. Sheldon's case there was a local effect on the middle coats of the arteries. He had frequently seen the selective action of atheroma.

Dr. H. J. Ritchie thought that confusion would arise if the term arterio-sclerosis were employed to signify one class of arterial disease. It was frequently used as a general term. Professor Welsh had incidentally referred to changes which he described as senile changes. He had seen young and middle aged individuals with "pipe-stem" arteries and a low blood pressure. Clinically, this was a type of arterio-sclerosis, but it was not a form of arterio-capillary-fibrosis, and it was not a luetic manifestation. Then again, he had met with degeneration changes during the convalescence from acute diseases. In these cases the blood pressure was low. The changes usually disappeared in the course of a month or two, or possibly of a year or two, but occasionally spasm.

Professor Welsh called attention to the fact that he had specifically stated that his demonstration should not be regarded as a complete statement of arterial disease. He had referred briefly to the senile changes and premature senile changes in the arteries, and to the toxic effects met with in certain infectious conditions.

Dr. W. F. Litchfield thanked Professor Welsh for his lucid demonstration. He was interested in the method of teaching pathology by studying together all the organs in one case, as opposed to the method of studying a number of similar organs from different cases. He thought that the former was a distinct advance, and suggested that if a series of organs were at the disposal of clinical teachers, it would be a great assistance to them. He thought that Professor Welsh had made out a good case for regarding arterio-sclerosis and syphilitic disease of the arteries, namely, nodular atheroma and endarteritis, as two distinct diseases. At the same time, in most cases of advanced arterio-sclerosis patches and streaks of atheromatous degeneration were found in the aorta. He held that these were to be explained by the long continued stress of high blood pressure. He was doubtful whether any sharp distinction could be drawn between senile changes in arteries and the changes occurring in arterio-sclerosis. These observations, however, did not in any way oppose Professor Welsh's main contention. In regard to the origin of the high blood pressure in arterio-sclerosis, he held that the peripheral resistance was in the capillaries and that the changes in the arteries were secondary and defensive. He was not prepared to discuss the views, which he had held for some years, in detail that evening.

In reply to Professor Welsh, who asked why, if the peripheral resistance was in the capillaries, did morphine relieve the pressure by relaxing the arteries. Dr. Litchfield said that he held the opinion that morphine and other drugs that reduced blood pressure, acted on the circulation in the capillaries, and did not act directly on the arterioles.

The undermentioned has been nominated for election as a member of the New South Wales Branch:—

Victor Asher, M.B., Ch.M., 1917 (Univ. Sydney), 31 Hurley Street, Paddington.

Special Correspondence.

(By our Special Correspondent.)

CANADA LETTER.

Compulsory Service in Canada.

The twelfth Parliament of Canada came to an end on September 21, 1917, after a memorable session. It was the longest session of the longest Parliament of any since Confederation fifty years ago, and will be remembered particularly for the war-time measures that have been passed and for its resort to closure in order to get those measures through the House. The Income War Tax Act, the Military Voters' Act, which gives the Canadian soldiers overseas an opportunity of voting in the general election, the War-Time Elections Act, which disfranchises aliens and gives the vote to women relatives of members of the Canadian Expeditionary Force overseas, the Soldiers' Settlement Act, and the Military Service Act, which provides for selective conscription to the number of 100,000 men, have all been passed, some of them in face of a good deal of opposition. The Pensions' Act, which it was the intention to amend, unfortunately had to be left over; it will be brought in next session, and in the meantime the existing scale of pensions will be increased as circumstances demand.

Medical Boards are being established throughout the country and arrangements have been made for the immediate examination of unmarried men and widowers without children between the ages of 20 and 35, in order to avoid congestion and delay when the same men are called up at the beginning of October.

An able speech in favour of the Military Service Act was made in the Senate on August 3, 1917, by Brigadier-General the Honourable James Mason, who gave some interesting figures relating to enlistment of Canadians. The total enlistment in Canada up to July 15, 1917, was 426,622. The population of males between the ages of 18 and 45 shown by the 1911 census was 1,720,070. Comparing the enlistments in the various provinces, Ontario has contributed 40,133 more men than its actual share, and the Western provinces have also exceeded their proportionate share—Manitoba and Saskatchewan by 7,943; Alberta by 5,448; and British Columbia by 2,206; whereas the province of Quebec has failed by 50,176, and the Maritime provinces by 5,554 to contribute an equal proportion. The number of men discharged from the Expeditionary Force in Canada up to May 31, 1917, was 64,552.

The necessity for some measure which would provide for the selective conscription of the required number of men, has been only too apparent during the past few months, when the number of recruits has been very small. Moreover, some action was necessary to protect certain classes of labour, as, for instance, out of 2,400 enlistments among employees of the Dominion Coal Company at least 2,200 were among workmen employed underground. The present coal shortage makes it particularly undesirable that miners should be allowed to enlist in large numbers.

Under the Military Service Act, medical men of military age will be divided into three classes according to their physical fitness—Class A, who will go overseas; Class B, who will be posted for duty probably in England or at one of the Canadian camps; and Class C, who will serve on the staffs of hospitals in this country. The age limit for overseas service is forty-five, and for home-service forty-eight years. Physicians over forty-eight years of age may be attached to the consulting staff of Canadian Military Hospitals. Committees have already been appointed to make a census of all medical men in some of the provinces.

The Annual Meeting of the Canadian Medical Association.

For the past two years, in consequence of the war, no annual meeting has been held of the Canadian Medical Association. This year, however, a meeting was decided upon. It was the forty-eighth annual meeting, and was held on June 13, 14 and 15, 1917, in the Medical Building of McGill University, Montreal, proving a great success from every point of view. Over three hundred members were in attendance—a good attendance even for times of peace.

The programme was an excellent one. The presidential address was delivered at the annual banquet by Dr. A. D. Blackader, acting Dean of the Faculty of Medicine of McGill University, who referred to the fact that it was just fifty years ago since the Canadian Medical Association was formed at a meeting arranged by the Quebec Medical Society, and held in the University of Laval, Quebec, on October 9, 1867. The President referred to the rapid changes that were taking place in the practice of medicine; leaders were needed who would undertake the distinterested study of social and economic questions, and committees should be appointed to study and report upon such matters, so that when the time for legislation came they could co-operate with the Government in such matters at national insurance again sickness or accident and other current problems.

The Address in Medicine was delivered by Dr. Theodore C. Janeway, of Johns Hopkins University, Baltimore, and seldom have the members of the Association listened to an address of such masterly style and brilliance. Under the title "Slight Variations from Normal Structure and Function and their Clinical Significance," from the point of view of the modern consultant, Dr. Janeway touched the higher ideals and aspirations of the profession. He showed how the vast extension of knowledge, and the introduction of the finer methods of investigation, combined with the change of the modern point of view from that of therapeusis to prevention of disease and the substitution of the ideals of the new physiology, had lent an added complexity to the work of the physican, whose duty it was to employ his personal observation and experience in forming a correct judgement from the information placed at his disposal by subjective and objective facts. "Department store medicine" must be relegated to its proper subordination. A medical opinion was not an academic exercise, and its standard not that of abstract truth. To exceed the possibilities of useful application was to conduct research. Moreover, the concept normal had a high degree of relativity. Dr. Janeway closed an inspiring address with a stirring reference to the part taken by the Canadian profession in the war, ending with the words: "May we not fail to meet the test and, shoulder to shoulder, with you, ensure that victory of justice and mercy which alone can bring an enduring peace."

In the Address in Surgery, Dr. Francis J. Shepherd, of Montreal, reviewed the progress that has taken place during the past fifty years, and the methods now employed in the present war. He thought that medical men in Canada should stand more firmly on their own feet, and that the time had come when a Royal College of Surgeons should be formed, which would be affiliated with that of Great Britain.

The Address in Public Health was delivered by Dr. Charles J. Hastings, Medical Officer of Health of Toronto. This address was open to the public, and was listened to with great interest by a large audience.

A number of valuable contributions were read in the various sections. In the Surgical Section, Dr. Cotton, of Toronto, demonstrated a new ether, which is a promising advance in the science of anæsthesia. As yet the ether is made only by Dr. Cotton himself, and is not on the market. Among the matters taken up were the following: blindness in the new-born—a committee was appointed at the Section of Gynæcology and Obstetrics to urge upon the General Executive Committee the importance of bringing this matter before the Dominion and Provincial authorities; venereal diseases; the teaching of hygiene in schools; the establishment of a Federal Department of Public Health; and the importance of more thorough inspection of immigrants.

Correspondence.

HIGH BLOOD TENSION IN ARTERIO-SCLEROSIS.

Sir,—In discussing Professor Welsh's very illuminating address on diseases of arteries and their effects, on Friday evening, December 14,[1] I expressed the opinion that the cause of the high blood tension that occurred in arterio-sclerosis was not due to spasm of the arterioles, as suggested by him, but to increased resistance in the capillaries, and that the changes in the arterioles were secondary to this. As this view seemed to be new to Professor Welsh and Dr. Mills and to some extent to have aroused their opposition, I would be glad if you would allow me space to state briefly some of the reasons why I adopted it.

(1) In the mechanics of the circulation the arteries must be regarded as elastic tubes whose duty it is to ensure an even flow of blood through the capillaries. *A priori*, therefore, one would expect changes in the arteries to be secondary to changes in the capillaries.

(2) From a developmental standpoint the arteries may be regarded as prolongations of the heart, and as serving the same purpose. It seems absurd to suppose that the terminal parts of this muscular mechanism should be so constructed as to be in the constant habit of opposing its main purpose.

(3) Under the stop-gag theory the blood is in a measure doled out to the tissues, while under the other theory the chief control of the blood supply resides in the tissues, and these take the blood as they need it.

(4) The experimental work that is relied on to establish the stop-gag action of the arterioles, shows nothing more than that there are vasomotor nerves and that they are susceptible to stimulation.

(5): Observation of the physiological working of the salivary glands and the stomach shows that secretory activity is always accompanied by vaso-dilator activity, but there is much to show that the tissue activity precedes the vascular activity and that the chemical action of the products of metabolism directly influence the latter.

(6) When fatigue occurs in either gland or muscle the circulation becomes depressed, tending again to show that it is the tissue or capillary circulation that controls the blood supply, the arterioles merely acting as regulators.

(7) In the high blood pressure of arterio-sclerosis the circulation is obstructed universally. Yet two organs, the heart and the brain, are either not at all or insignificantly supplied with vaso-motor nerves.

(8) In shock it has been shown by Bainbridge and Trevan that considerable obstruction occurs in the portal circulation of the liver, yet the portal vein has no vaso-motor nerves.

(9) The existence of capillary tone has been demonstrated by Cotton, Slade and Lewis. Any alteration of this must influence the blood pressure.

(10) The viscosity of the blood alters from various causes and, *pari passu*, so does capillary resistance.

(11) A modern view of the high tension pulse in arterio-sclerosis is that it is conservative in action, while the spasm theory implies that it is the disease.

(12) Under physiological conditions it is the vast capillary bed that makes the peripheral resistance. Why should this be altered in disease?

(13) In chronic Bright's disease the urinary secretion, and therefore the blood circulation through the kidneys, are freer in the evening or so-called acid tide than in the morning or alkaline tide. In most healthy young people the opposite condition prevails. This looks as though there is a chemical factor concerned in the peripheral circulation. In possible relation to this is Martin Fischer's statement that the blood under ordinary conditions is a neutral fluid, but that both a slight acidity and a slight alkalinity reduces its viscosity.

The conclusion, however tempting, that morphia and other drugs lower arterial tension by primarily reducing spasm is only an assumption. Morphia will relieve a heart failing before a high peripheral pressure, it will also relieve a heart failing on account of the valvular defects. In the latter case surely spasm of the arterioles is not the cause of the heart failure. As a matter of fact, in such a case to relax the arteries without affording relief beyond them would only increase the embarrassment of the heart, since arterial tone assists the circulation.

The whole question is one of probabilities, but it seems to me that peripheral resistance in health and disease resides in the capillaries, and that vaso-motor activity is secondary, being either accommodative or defensive. What is the precise nature of the obstruction in arterio-

[1] The publication of this letter has been delayed until the publication of the discussion referred to.

sclerosis I would not venture to say. I agree with Professor Welsh that it is the outcome of metabolic defect, and would make the tentative suggestion that it is caused by the products of chronic fatigue.

That the view expressed above is not altogether a new one will be evident from the following quotations from an article by Sir William Broadbent in the *British Medical Journal*, 1898: "In discussing the significance of variations of vascular tension, therefore, we have to direct our attention mainly to the conditions influencing the resistance at the periphery. . . . But obstruction in the capillaries and contraction of the arterioles are usually correlated, obstruction in the capillaries calling into action a defensive contraction of the arterioles. . . . This for the most part is the cause and significance of the high tension pulse, the resistance being primarily in the capillaries and the stopcock action of the arterioles secondary and defensive. . . . The diminished resistance of the febrile state is often attributed to vaso-motor paresis of central origin. I am inclined to think that the relaxation of the capillaries is the direct effect of some blood condition, and that vaso-motor paresis of the arterioles is secondary to this."

Yours, etc.,

W. F. LITCHFIELD.

Sydney, December 12, 1917.

THE MENACE OF THE BIRTH-RATE.

Sir,—No one can read the address given by Professor Berry without being greatly impressed, and without feeling that everything should be done to combat the disastrous results of a falling birth-rate.

It seems to me particularly apt that a medical man should help to bring the subject under notice, for it is, I think, in many cases that a medical man is to blame when a woman has one child and refuses to have another.

Women now-a-days are far more highly strung and sensitive than the women of 30 years ago, and in most cases they stand pain very badly, yet many of them are forced to go through labour without the slightest attempt at alleviating their pain; in fact they are confined—in many cases—just as women were 30 or more years ago.

It is the horror of the agonizing pain endured at the first childbirth, which makes some women terrified at the thought of going through with it again. I have spoken to several women who have only one child, and it is the same tale over and over again.

And there is absolutely no necessity for it. With hyoscine compound and chloroform patients can have their babies with almost a minimum amount of suffering, and they all declare that the ordeal was not one hundredth part as bad as they anticipated. Instead of this one hears of no attempt being made to ease their pain; indeed, one frequently hears of forceps being applied without the use of an anæsthetic.

Some medical men, I believe, say that hyoscine compound or scopolamine compound are dangerous to the child. This is very astonishing to me. I have given the first for many years, and have never had even the slightest trouble. I never give it if I think the baby will be born in less than three hours. In fact, contrasting delivery now with what it was 15 years ago, when one was forced to put the instruments on, for the patient's sake, in an occipito-posterior high up, one sees what a God-send hyoscine compound is. Still-born children were far more common in those days than now. Do these objectors who refuse to give sedatives never have still-born babies? It seems to me, Sir, that apart from the humane question, it is an absolute duty for medical men to do their share to combat such a state of affairs as Professor Berry has helped to bring forward. Let us strive to alleviate the torture, and it is nothing else in many cases, of childbirth and we will find fewer "one-child women."

Only recently I attended a woman in her first confinement, she had hyoscine compound and chloroform; a few hours after delivery she volunteered the statement that she would never dread going through it again, and yet she was suffering acutely before she received the injection.

Yours, etc.,

J. ROSENTHAL.

336 Burke Road, Upper Hawthorn,
Victoria, December 21, 1917.

Sir,—I have read Professor Berry's presidential address to the Victorian Branch, B.M.A., and I also had the pleasure of listening to its energetic and striking delivery, but I am not satisfied to accept all the facts and most certainly not the conclusion or conclusions.

As this question is of momentous importance, may I crave your indulgence in order to state a view of the case that I deem of the utmost importance?

I believe, firstly, it is possible that Professor K. Pearson's figures are wrong. It is notoriously difficult to state all sides of a case by the statistical method, but let us grant them to be correct.

Secondly, it is necessary in dealing with problems of birth-rate to know (*a*) the death rates for corresponding periods, (*b*) the ratio of legitimate to illegitimate births, (*c*) the ratio of children born to children that grow up to healthy adult life. But I do not propose to discuss these problems, as it is to the third and most important aspect of the question that I wish to call to the attention of your readers.

Thirdly, the question of a falling birth-rate, as exemplified in Professor Berry's address, is at bottom a problem solely due to the social and economic system in the grip of which practically all nations find themselves, this system being that of the private ownership of land values. I am convinced, after years of study, that no matter how we look at many of the problems that face us as medical men, such as tuberculosis, venereal diseases, and falling birth-rates, the root cause of them all is found in this false economic system into which we are all born. It is the cause of the vast social degradation, the great and growing inequality in the distribution of wealth, the growth of huge cities, the deplorable diminution in agricultural pursuits and, lastly, this awful war now raging. Some of the greatest thinkers of our own and past times and many of our most brilliant politicians, including the present Prime Minister of Great Britain, agree that it is the land question that is at the root of most of our social evils. It is this monopoly of land values by the few which, in spite of the stupendous impetus given to man's productive efforts by modern science, has only led to "progress and poverty," to class hatred, to the absurd conflict (so-called) of labour and capital everywhere throughout the world. But in its special application to the birth-rate we again see exemplified the immutable law of cause and effect. All wealth is produced by labour from land, therefore they who own the land have a monopoly over the efforts of the landless, and as population increases and science gives ever more and more productive power into the hands of men, so the value of land rises, and its owners are able to abstract more and more of the labour of men's hands.

Taxation in consequence must be placed upon industry, capital and labour find it ever harder to obtain their full reward due to them, and so land falls out of use, people swarm to the cities and sell their labour for a song; wages boards, fair rent courts, arbitration courts, notification of infectious disease, baby bonuses are all powerless to stay the inevitable rot that slowly developes. Rents rise and wages fall, a natural law as immutable as that of gravity. One of the final results is a restriction of families. Why should men and women bear children who will only swell the labour market and sell their birth-rights for a mere livelihood? Briefly and imperfectly stated this, I believe, to be the universal cause of a universal fall in birth-rate in highly civilized countries, not the ranting of Mrs. Besant nor Mr. Bradlaugh, nor the sale of lead pills, nor syringes. These are the outward and visible signs of the cancer that is festering in all nations. Let legislation by all means be brought in to stop these practices, but if that alone be done, I venture to say the birth-rate will go on falling until the root cause is removed.

This letter is not written with the intent of pushing any particular political plank, but to call the attention of the profession to take a wider and deeper aspect of the great problems which confront it. In conclusion may I point out that Professor Richet, of Paris, in a recent report to the French Academy of Medicine, attaches most weight to "the increasing cost of rearing children" in the factors determining a fall in birth-rate, and Dr. Louis Parkes, in

another article, attached probably most weight to the doubt of both parents as to the future of their offspring.

Yours, etc.,

PAUL G. DANE.

80 Collins Street, Melbourne,
(undated).

ECONOMY IN THE USE OF COCAINE AND OTHER ALKALOIDS.

Sir,—Having widely proved its efficacy in France, in March last I had a 4% solution of cocaine hydrochloride made up for me, according to a modification of Bishop Harman's diluting fluid. After nine months' daily use of this stock solution I have still some of it left. It shows no sign of deterioration in power, nor any evidence of fungus formation. For some months now I have had all my alkaloid ophthalmic solutions made up with this diluting fluid; and I have found that it causes little or no discomfort to the patient. Practical tests with the higher percentages of cocaine as used in nasal work have proved quite satisfactory. In intra-ocular operative ophthalmic work it may be advisable to volatalize and rid both these substances. This can be readily done by heating a small quantity of the solution taken from the stock bottle. My experience, however, has convinced me that the solution is quite satisfactory for all purposes.

The formula I use is:—

Ol. gaultheriae, 0.31 c.cm.
Tinct. iodi., 0.31 c.cm.
Aquam. dest. ad 1,000 c.cm.

Owing to the greater evaporation then, I have a slightly stronger solution made for use in the summer months.

Since cocaine is becoming continually more scarce and expensive, and one sees in public hospitals and elsewhere many solutions of cocaine that have become useless, the above information may be serviceable to economists.

Yours, etc.,

R. GRAHAM BROWN.

Preston House, Queen Street,
Brisbane, January 9, 1918.

Medical Appointments Vacant, etc.

For announcements of medical appointments vacant, assistants, locum tenentes sought, etc., see "Advertiser," page xvii.

Commonwealth Serum Laboratories, Biochemist, Senior Bacteriological Technical Assistant, and Bacteriological Technical Assistant.

Medical Appointments.

IMPORTANT NOTICE.

Medical practitioners are requested not to apply for any appointment referred to in the following table, without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, 429 Strand, London, W.C.

Branch.	APPOINTMENTS.
VICTORIA. (Hon. Sec., Medical Society Hall, East Melbourne.)	Brunswick Medical Institute. Bendigo Medical Institute. Prahran United F.S. Dispensary. Australian Prudential Association Proprietary, Limited. National Provident Association. Life Insurance Company of Australia, Limited. Mutual National Provident Club.
QUEENSLAND. (Hon. Sec., B.M.A. Building, Adelaide Street, Brisbane.)	Medical Officers to the Selwyn Hospital, North Queensland. Brisbane United Friendly Society Institute.
SOUTH AUSTRALIA. (Hon. Sec., 3 North Terrace, Adelaide.)	The F.S. Medical Assoc., Incorp., Adelaide. Contract Practice, Appointments at Renmark.
WESTERN AUSTRALIA. (Hon. Sec., Health Department, Perth.)	All Contract Practice Appointments in Western Australia.
NEW SOUTH WALES. (Hon. Sec., 30-34 Elizabeth Street, Sydney.)	Australian Natives' Association. Balmain United F.S. Dispensary. Canterbury United F.S. Dispensary. Leichhardt and Petersham Dispensary. M.U. Oddfellows' Med. Inst., Elizabeth Street, Sydney. Marrickville United F.S. Dispensary. N.S.W. Ambulance and Transport Brigade. North Sydney United F.S. People's Prudential Benefit Society. Phœnix Mutual Provident Society. F.S. Lodges at Casino. F.S. Lodges at Lithgow. F.S. Lodges at Parramatta, Penrith, Auburn and Lidcombe. Newcastle Collieries — Killingworth, Seaham Nos. 1 and 2, West Wallsend.
TASMANIA. (Hon. Sec., Belerive, Tasmania.)	Medical Officers in all State-aided Hospitals in Tasmania.
NEW ZEALAND: WELLINGTON DIVISION. (Hon. Sec., Wellington.)	Friendly Society Lodges, Wellington, N.Z.

Diary for the Month.

Jan. 22.—N.S.W. Branch, B.M.A., Medical Politics Committee; Organization and Science Committee.
Jan. 29.—N.S.W. Branch, B.M.A., Council.
Jan. 30.—Vic. Branch, B.M.A., Council.
Feb. 1.—Q. Branch, B.M.A., Meeting.
Feb. 6.—Federal Committee of the B.M.A. in Australia, at Melbourne.
Feb. 6.—Vic. Branch, B.M.A., Monthly Meeting; Presentation of Balance Sheet for 1917.
Feb. 12.—Tas. Branch, B.M.A., Council and Branch.
Feb. 12.—N.S.W. Branch, B.M.A., Ethics Committee.
Feb. 14.—Vic. Branch, B.M.A., Council.

EDITORIAL NOTICES.

Manuscripts forwarded to the office of this Journal cannot under any circumstances be returned.

Original articles forwarded for publication are understood to be offered to *The Medical Journal of Australia* alone, unless the contrary be stated.

All communications should be addressed to "The Editor," *The Medical Journal of Australia*, B.M.A. Building, 30-34 Elizabeth Street, Sydney, New South Wales.